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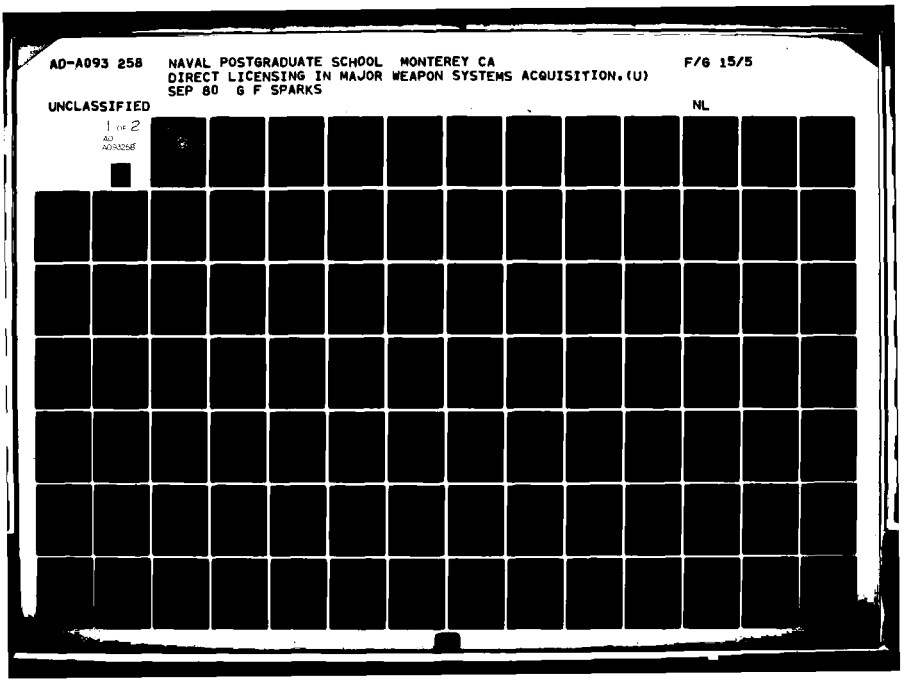

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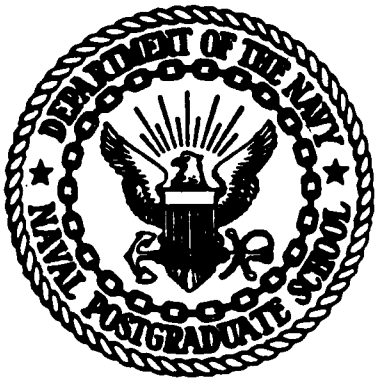

THESIS

DIRECT LICENSING IN MAJOR WEAPON SYSTEMS ACQUISITION

by

George Francis/Sparks

September 1980

Thesis Advisor: D. V. Lamm

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This research was undertaken to analyze direct licensing as an acquisition strategy for major weapon systems. The main objectives were to determine to what extent licensing can be an advantageous strategy and to develop a model to aid the decision maker in determining whether a licensing strategy should be employed.

The researcher found that domestic licensing has seen limited application in DOD acquisition strategies. This occurrence stems from the fact that, as a second sourcing method, licensing does not lead to effective price competition.—

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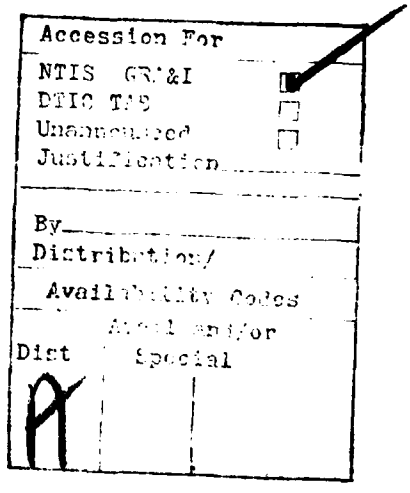
Rather, direct licensing serves DOD as a strategy to establish a production or mobilization base.

Three reasons were presented for attempting a licensing agreement; (1) when the developer claims ownership rights to relevant data or processes, (2) when the complexity of the system dictates that the second source requires technical assistance from the developer, and (3) when the Government desires that the prime developer retain design responsibility for the life of the system.

The Thesis concluded by presenting a Direct Licensing Decision Model which provides a concise logical framework to follow when one is contemplating a direct licensing acquisition strategy.



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Direct Licensing In Major Weapon Systems Acquisition

by

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Lieutenant, Supply Corps, United States Navy
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Submitted in partial fulfillment of the
requirements for the degree of

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ABSTRACT

This research was undertaken to analyze direct licensing as an acquisition strategy for major weapon systems. The main objectives were to determine to what extent licensing can be an advantageous strategy and to develop a model to aid the decision maker in determining whether a licensing strategy should be employed.

The researcher found that domestic licensing has seen limited application in DOD acquisition strategies. This occurrence stems from the fact that, as a second sourcing method, licensing does not lead to effective price competition. Rather, direct licensing serves DOD as a strategy to establish a production or mobilization base.

Three reasons were presented for attempting a licensing agreement: (1) when the developer claims ownership rights to relevant data or processes, (2) when the complexity of the system dictates that the second source requires technical assistance from the developer, and (3) when the Government desires that the prime developer retain design responsibility for the life of the system.

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ACKNOWLEDGEMENTS

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I. INTRODUCTION

A. GENERAL

To be a world power today, a nation must possess a strong military capable of projecting its influence in any corner of the globe, virtually within a moments notice. The Department of Defense (DOD), in fulfilling their vital national defense role, must arm America appropriately. One of DOD's tasks of arming this country involves obtaining sophisticated weapon systems. Due to the dynamic and complex environment of the major weapon systems marketplace, Congressional laws and policies have established a systematic and logical approach that must be utilized when buying weapon systems. It is through this acquisition process that individual weapon systems, referred to as programs, are obtained by DOD. Each program is headed by an unique program manager (PM). Working within DOD directives, the PM develops a plan which specifies how the particular weapon system will be acquired by the Government. With several acquisition strategies at the program manager's disposal, he faces a series of decisions which culminates in the selection of an acquisition strategy. Licensing is one such strategy.

In its broadest sense, licensing occurs when a firm possesses data, know-how, trade secrets or other valuable information and, through a contractual agreement (license), provides that information to another firm in return for some type of consideration, usually in the form of a royalty. As an acquisition strategy, licensing requires a contractor (licensor) who owns some information (data, patents or production

know-how) to transfer those facts to another contractor (licensee) which would allow the licensee to manufacture a specific component of a system or perhaps the entire weapon system. For this, the licensor receives consideration from the Government.

This paper will delve into licensing to examine the potential benefits of the strategy and to develop a model which will aid a program manager in determining whether a licensing strategy should be embarked upon.

B. OBJECTIVES OF THE RESEARCH

The objectives of this study were twofold: (1) to determine to what extent licensing can be an advantageous acquisition strategy; and (2) to develop an analytical method that will aid in the decision-making process as to whether licensing should be employed in a specific acquisition.

C. RESEARCH QUESTIONS

To achieve the objectives of the research, the following questions were probed:

1. To what extent can licensing be an advantageous acquisition strategy?

   a. What is licensing and what problems and issues permeate this acquisition strategy?

   b. How has licensing been accomplished in the acquisition arena?

   c. What is the current Government policy regarding licensing?

   d. What are the advantages and potential uses of licensing?

2. Can an analytical method be developed which will aid the program manager to determine whether licensing techniques should be utilized in his project?

D. RESEARCH METHODOLOGY

The information discussed and analyzed in this paper was acquired by: reviewing acquisition literature held by the Naval Postgraduate School, Defense Logistics Studies Information Exchange (DLSIE), and the Federal Acquisition Institute including studies completed by Government agencies and employees, the RAND Corporation and the Logistics Management Institute, thesis and dissertations, and texts of Congressional Hearings from the Armed Services Committees; reviewing and scrutinizing project office and contracting officer files and records from selected projects; personal and telephone interviews with Government and contractor personnel knowledgeable in the acquisition arena including individuals responsible for establishing acquisition policy, patent and general counsels, and personnel in several program offices throughout DOD. The vast majority of data, philosophies and opinions reported here-in emanated from personal and telephonic interviews. The guidelines utilized during these interviews are contained in Appendix A.

E. SCOPE AND LIMITATIONS

This study will be confined to major weapon system acquisitions for DOD, including major components thereof. Foreign licensing arrangements and Foreign Military Sales (FMS) will only be examined to the extent of explaining how licensing complements the environment

and commenting on relevant issues. The focus of this research endeavor was to investigate the utilization of licensing as a second sourcing method in the procurement of U.S.-produced weapons for use by the U.S. Armed Forces.

F. ASSUMPTIONS

A familiarity with standard DOD acquisition procedures, and the environment in which major weapon systems contractors operate, will be assumed. Furthermore, a fundamental knowledge of DOD program management structure, operation and terminology will be presumed.

G. ORGANIZATION OF THE STUDY

This thesis flows in a logical systematic pattern. Chapter II sets forth the concepts and policies of the major weapon acquisition process. Intellectual property, intellectual property rights, and the meaning of direct licensing will be explored in the Second Chapter. Chapter III reviews background information on licensing as utilized in DOD. Chapter IV presents the licensing process as found in the literature and as envisioned by interviewees. The factors driving the licensing decision and its associated benefits, limitations and problems will be enumerated in this Chapter. Chapter V presents some actual cases which utilize licensing. The cases discussed were selectively chosen to glean relevant licensing techniques, philosophies and facts. Chapter VI will analyze the decision-making process discussed in Chapter IV, reflecting on Chapter V's cases to modify or refine the process. Analysis of DOD's licensing policy will round out the Chapter. An analytical model to aid the program manager to determine whether licensing

techniques should be utilized in a specific acquisition will be presented in Chapter VII. Chapter VIII contains conclusions and recommendations of the study.

II. FRAMEWORK

A. THE ACQUISITION PROCESS FOR A MAJOR WEAPON SYSTEM

The acquisition strategy of any major weapon system program is an inherent part of the overall acquisition process for that system. The acquisition process, composed of several different phases and decision points, will be elaborated on so that the environment the acquisition strategy must operate within is understood.

The acquisition process for a major weapon commences with recognition of either a deficiency in a current mission element capability or an opportunity to establish a new mission element capability, as a result of technological advances [39]. The Mission Element Need Statement (MENS) officially communicates this deficiency or opportunity to the Secretary of Defense (SECDEF). SECDEF conducts a thorough review of the MENS which culminates in either approval or disapproval of the MENS. Approval of the MENS during this process, Milestone 0, is crucial for the program's survival and its entrance into Phase 0, the Alternative Concept Exploration Phase [39:2-3].

The initial approval of the MENS establishes a unique system acquisition program headed by a newly designated Program Manager (PM). The PM assumes many responsibilities which directly affect the program and its final product. One of the first tasks the PM faces involves the developing of an acquisition strategy for the program. The resulting acquisition plan, although emphasizing near term action items, encompasses the entire system's acquisition process. The PM,

with his personnel, must address a myriad of policies and acquisition questions. Some key concepts which must be resolved include [32:4-5]:

1. How competition will be obtained and sustained throughout the program.

2. How data rights will be utilized.

3. Should warranties be employed?

4. To what extent contractor incentives need to be developed.

5. What type of contract is best suited for each phase of the acquisition process.

The acquisition strategy thus explicitly states the program's methodology of obtaining and initially supporting the future weapon system. This dynamic strategy, although established in Phase 0, must enable the PM to adequately respond to future acquisition reviews and problems encountered during the life of the system. The acquisition strategy is the foundation for the entire program's acquisition process. Upon delineating this strategy, Phase 0 actively begins. The exploration of alternative systems is accomplished through a mission-need solicitation process to industry. The innovative ideas proposed by industry are then evaluated and summarized by the PM in a Decision Coordinating Paper (DCP). The DCP contains the PM's recommendations regarding which proposed systems should proceed into Phase I, Demonstration and Validation. The Defense System Acquisition Review Council (DSARC) reviews the DCP and forwards it with appropriate comments to SECDEF for reaffirmation of the MENS and approval of specific alternative systems for competitive demonstration and validation. SECDEF's approval, Milestone I, separates Phase 0 and Phase I [31:9-16].

Competitive demonstrations, utilizing prototype models, enable verification of the soundness of the concepts, performance in an operational environment, and provide a meaningful selection basis to determine which system design concept(s) are to be continued into Phase II, Full Scale Development/Initial Production (FSD) [32:9]. The PM, drawing on knowledge gained through the demonstrations and close liaison with the developers, prepares a recommendation for the system(s) to proceed into FSD. The ability of the system(s) to meet the mission need, analysis of future risks, consideration of estimated initial procurement and operational costs, and the characteristics of the developer's organization (resources, abilities and business factors) must all be reviewed by the program office prior to making the recommendation. An updated DCP is forwarded through the DSARC to SECDEF. Milestone II occurs when SECDEF reaffirms the mission need and grants approval of the selection of the system(s) to proceed into FSD [32:9-11].

Full Scale Development/Initial Production allows the selected contractor(s) to fabricate and produce the actual end product. These initial product units become subject to rigorous tests and evaluations in an environment that assures effective and reliable performance in anticipated operational conditions. In addition to providing the contractor with a basis for sound production proposal data, this valuable production/testing information provides the necessary data to update the DCP. The revised DCP, containing the PM's recommendation for the system to proceed into Phase III (Production and Deployment), again progresses through a DSARC and to SECDEF. With this approval, Milestone III, the weapon system is finally produced and deployed into the field and the acquisition cycle for that particular system is complete [31:18-20].

With the review of the major weapon acquisition process completed, attention will now shift to policies that influence the philosophies of the acquisition strategy including the quantity and type of contracts utilized in the different phases of the acquisition process.

B. COMPETITION AND THE ACQUISITION PROCESS

Congressional testimony, acquisition literature, and the entire spectrum of Federal and DOD regulations and instructions governing acquisition policies and procedures are impregnated with the philosophy that competition is valuable and beneficial. This desire for competition, traceable back to the creation of our free enterprise system, allows DOD to facilitate the process of obtaining technically superior weapon systems from the industrial marketplace. Achieving the ultimate goal of the acquisition process - acquiring the best system at a fair and reasonable price, on schedule - generally requires the employment of two distinct and independent forms of competition: design and production [71:17].

Design competition involves a dynamic process of creating several unique potential solutions which satisfy a MENS and then, through an evaluation process, choosing the best system. This competition normally occurs during Phases 0 and I, culminating in source selection at DSARC II. In recent procurements, design competition has been extended through Phase II. The object of design competition centers around the selection of a system, and not on the manufacturer(s) of that system [71:17-18].

Production competition occurs only after one decides which system will be allowed to transcend into Phase III [71:18]. Production

competition is the process of soliciting offers from two or more independent, qualified manufacturers for the production of identical, or nearly so, systems and upon a thorough evaluation of the offers, selection of the producer(s). The selection process could result in awards to more than one contractor, depending on the particular situation. The objective of this competition is a low, fair and reasonable price for the end product [71:18-19].

Competition, in its purest sense, does not exist in the defense marketplace. Nonexistence of perfect competition in the DOD acquisition process stems from the following factors: (1) the Government is the sole buyer, (2) there are significant barriers to entry into and exit from the marketplace, and (3) none of the participants has perfect knowledge of all the relevant economic and technological data. In the acquisition arena, one strives to create *effective competition*, since perfect competition is unattainable. Effective competition occurs when the improvement derived through competition outweights the expenditures of creating the competitive environment. In evaluating an effective competition situation, one must include significant nonquantifiables as well as the quantifiables, such as monetary costs [71:20-21].

In the acquisition process of major weapon systems, effective competition can only be achieved if more than one seller exists (monopsonistic market). The quantity of sellers available in the marketplace will be dependent upon which phase of the acquisition process the system is in, the quantity of the buy, the sunk costs required to be invested which will enable the contractor to participate in the contract, and the amount of risks a potential contractor envisions. Typically, several

sellers exist in the early phases of the acquisition cycle with a marked reduction in the later phases. Throughout the remainder of this thesis, the use of the term *competition* will refer to effective competition [17:21-22].

C. SECOND SOURCING

One of the key decisions which a PM must make in his/her acquisition strategy includes how competition will be fostered. Second sourcing enables the PM to stimulate competition in the Production Phase.

Second sourcing means creating two or more independent and qualified manufacturers (sources) for the purpose of producing an item to satisfy a particular need. Second sourcing and production competition go hand-in-hand. To have effective production competition, the PM must take measures to obtain and retain two or more sources that are capable of producing the system (and subsystems) desired [71:23].

In support of the DOD policy to obtain production competition when such competition is likely to result in lower overall costs, improved quality, reduced production lead time, or other benefits (to be discussed shortly), the decision to implement second sourcing should be addressed as early as possible in the procurement process, preferably during the concept development phase of the particular system. By making the final decision regarding second sourcing at Milestone 0, the development can be structured to facilitate the technology transfer which is so essential to production competition [47:4.701].

Second sourcing offers numerous potential benefits. The PM may embark upon a second sourcing endeavor in an attempt to achieve one or more of the following benefits [47:4.703 (A)]:

(1) The achievement of cost savings.

(2) A broadening of the production base to:

(i) maintain viable sources in areas of advanced technology.

(ii) lessen the effect of supply and demand fluctuations on the industrial base.

(iii) improve mobilization capabilities.

(3) Facilitate NATO participation.

(4) Facilitate the attainment of acquisition goals for small business and minority owned contractors.

(5) Develop new sources for future programs.

(6) Improve technical performance of equipment.

(7) Improve delivery times and insure against delays.

(8) Effecting transition from development to production and to subsequent competitive acquisition of end items or of major components.

Achievement of one or more of these objectives or benefits would most likely justify the establishment of a second source during Phase III of the acquisition process. Some of the predominantly known and utilized second sourcing methodologies include: contractor teaming, leader-follower, reprocurement data package, component breakout, and direct licensing [47:4.702-3].

The thrust of this research effort was to determine direct licensing's impact and potential contribution to the second sourcing endeavor.

D. INDUSTRIAL MOBILIZATION BASE

One compelling reason a PM may desire second sourcing revolves around mobilization production capacity requirements. The Defense Acquisition Regulations (DAR) (formerly the Armed Services Procurement Regulation (ASPR)) specifically addresses and grants authority to develop and implement plans and programs to provide an industrial mobilization base [37:3-216]. This base must be able to satisfy production requirements for essential military supplies and services. The DAR specifically allows the division of production requirements between two or more contractors to create the base, if determined by the Secretary that the interest of the industrial mobilization, in a national emergency, would be impaired by negotiations with a particular manufacturer [58:348].

The rationale supporting Mobilization Base is a dual faceted concept: (1) a single manufacturer would be unable to produce the quantities required in time of national emergency, and (2) dispersal of strategic risk to thwart the possibility of a single strike knocking out the country's entire production capacity for a system [65:19]. Typically, if mobilization becomes a top priority consideration for a PM, then competition and price factors take a secondary role in making the second sourcing decision [65:19].

E. INTELLECTUAL PROPERTY AND INTELLECTUAL PROPERTY RIGHTS

Fundamental to the principle of second sourcing is the premise of having two or more manufacturers producing the same item. The task of achieving identical producibility requires considerable exchange of

information between the two producers. Generally, one firm originally conceives, develops and produces the system and, with the Government acting as a catalyst, the second source absorbs the prime item developer's process so he too can manufacture the system. The information required to be transferred between the original and other producer is essential to the second sourcing process. This information, Intellectual Property (IP), demands a closer look.

A NATO implementation guide on Intellectual Property Rights (IPR) defines IP as:

> . . .inventions, trademarks, industrial designs, technical know-how, manufacturing information and know-how, techniques, technical data packages, manufacturing data packages and trade secrets [49:1-5].

IP breaks down into two distinct and subtle time frames; early and late IP.

Late IP can be described as:

> . . .information generated in the course of, or under, the program and includes any invention or discovery, whether or not patentable, conceived or first actually reduced to practice in the course of or under the program [20:479].

On the other side of the coin, early IP is defined as:

> . . .technical information necessary or useful to the program but generated outside of the program either in Government establishments or by contractors. . .[20:479].

The development and retention of early and late IP is a corporate policy based upon their overall business strategy. Early IP, that which provides insights and potential to design new products, are closely guarded trade secrets. It is precisely this early IP or design philosophy that makes certain companies leaders in their field. Most firms are not willing to transfer early IP. Early IP is far more valuable

to industrial firms than late IP, that which allows the replication of an already designed product [48:2-3]. To a PM desirous of qualifying a second source, the value placed on these distinctive categories of information takes on different roles. The PM needs late IP so it can be communicated to the second source and thus enable him to produce an identical item.

IP in the DOD environment consists of patents, data, and know-how. The ownership or control of the dissemination and use of patents, data, and know-how is a very important issue in DOD. IPR, the legal rights to IP, will greatly influence the acquisition strategy of a program [49].

1. Patent

A patent, a legal instrument (property right) granted by the Government which provides an inventor the possibility of protecting his invented item for a period of 17 years, represents the smallest portion of IP. Patents take on this role due largely because of their initial expense, lengthy processing time prior to issuance, requirement for public disclosure, and expense to police [48:1-2].

2. Data

The DAR defines data as, "recorded information, regardless of form or characteristic" [37:7-104.9]. Typically, the Government acquires this type of IP. Being in writing, one can describe and deliver data with comparative ease.

3. Know-How

Know-how is defined as the knowledge, insight and experience resident in individuals or private writings legally protected as

trade secrets. Computer software has taken on an increased role in this area. Due to their intangible nature, transferring know-how can be difficult [49:1-5].

4. Limited Rights

As defined by DAR, limited rights:

> . . .means rights to use, duplicate, or disclose technical data in whole or in part, by or for the Government, with the express limitation that such technical data shall not, without the written permission of the party furnishing such technical data, be (a) released or disclosed in whole or in part outside the Government, (b) used in whole or in part by the Government for manufacture, or in the case of computer software documentation, for reproduction of the computer software, or (c) used by a party other than the Government, except for:
>
> (i) emergency repair or overhaul work only, by or for the Government, where the item or process concerned is not otherwise reasonably available to enable timely performance of the work, provided that the release or disclosure thereof outside the Government shall be made subject to a prohibition against further use, release or disclosure; or
>
> (ii) release to a foreign government, as the interest of the United States may require, only for information or evaluation within such government or for such government under the conditions of (i) above [37:9-201(C)].

A contractor deserves limited rights to his data if he paid for the development cost. The basic intent with limited rights is that the financier of the item not be expected to provide data that would allow someone else to produce an identical product without his consent and receipt of consideration [42:3966].

For data to be developed at private expense, the Government must not have participated directly in the financing of the project. Limited data could still rightly be claimed even if Government funds indirectly paid for the research. For example, assume that the Government

represents a contractor's total business base. It is possible that this contractor's independent research may be indirectly supported through overhead burden paid by the Government, but because there was no direct payment of Government funds for these research projects, the Government gets no data rights from the research effort. As one might imagine, the line of demarcation between limited and unlimited rights is determined by careful evaluation [42:3966].

5. Unlimited Rights

The DAR defines *unlimited rights* as:

> . . .rights to use, duplicate, or disclose technical data or computer software in whole or in part, in any manner and for any purpose whatsoever, and to have or permit others to do so [37:9-201(d)].

If the Government has paid for any data development costs, the Government deserves unlimited rights to the data [42:3966].

Table 1 depicts the previously descussed IP terms and visually depicts that there are four different categories that each type of IP may fall into; early limited, early unlimited, late limited, and late unlimited. The DAR addresses only the four lower right boxes in this matrix [49]. One major reason for this is that DOD assumes that American firms within specific equipment areas have relatively uniform levels of know-how. In addition, DOD has not acknowledged a real need for large transfers of IP to fulfill its acquisition needs. The DAR allows for the acquisition of IP to obtain: (1) rights to patents and data required to effectively and efficiently operate and maintain the acquired systems and subsystems, and (2) other IP rights to patents and data that would permit reprocurement of the systems and

TABLE 1

INTELLECTUAL PROPERTY

TIME FRAME:	EARLY		LATE	
RIGHTS:	LIMITED	UNLIMITED	LIMITED	UNLIMITED
TYPE OF IP:				
KNOW-HOW	N/C*	N/C*	N/C*	N/C*
DATA	N/C*	N/C*	DAR**	DAR**
PATENT	N/C*	N/C*	DAR**	DAR**

SOURCE:
DEVELOPED BY RESEARCHER

NOTES: N/C*= NOT COVERED IN DAR
DAR**= COVERED IN DAR

subsystems [49:2-1-2-8]. The impact of DAR's scant IP coverage and the potential benefits of expanded IP coverage will be addressed in Chapter VI.

The area of greatest concern for the PM concerning IP centers around "Who owns what?" and "How will this affect the program?". The PM's acquisition strategy utilized to stimulate second sourcing will depend greatly upon the quantity and nature of limited rights claimed by the prime developer. Obviously, the PM has the greatest flexibility if the Government possesses rights to all the data; however, this is difficult to attain.

F. DIRECT LICENSING

In reviewing the acquisition literature concerning production competition, the terms direct or directed licensing appear frequently. Although the definitions found in the literature vary somewhat, there are many similarities. Prior to settling on a definition which will be utilized throughout the remainder of this thesis, selected definitions found in the literature and discussed during interviews will be provided.

The following definition of directed licensing represents one of the first to find its way into the literature. This definition, provided by the General Accounting Office (GAO) in its evaluation study of directed licensing, raises several interesting points.

> This method (directed technology licensing) proposes a clause for insertion in the early development contract allowing the Government to reopen competition for subsequent or follow-on production, select the winner, and appoint him as licensee. It *is aimed at obtaining competition in the reprocurement of techno*logical hardware, which is ordinarily very difficult to achieve. In return for royalty and technical assistance fees, the licensor would then provide the winner with manufacturing data and technical assistance to help the licensee produce successfully [25:2-3].

This definition points out that the term directed means that the Government shall select the licensee, and as such, the licensor has no say in this selection process. Secondly, this definition indicates that technical assistance will accompany the data package. This assistance greatly aids the transfer of IP between the firms since information and knowledge can be verbally and personally communicated between people. The objective of a licensing strategy was also clearly stated as obtaining competition in the reprocurement of a system. Acknowledging that establishing production competition is a tough task, GAO implied that licensing does aid the process. The final point to be gleaned from the previous definition concerns the consideration to be provided to the developer. The licensor expects to receive (1) a fee for providing technical assistance to the licensee, and (2) a royalty payment for each final product delivered to the Government.

A Rand study published five years after the GAO study provides a definition of directed licensing which complements the preceding definition.

> Directed licensing consists essentially of having the Government obtain from a weapon system developer, at the time of the development contract, a contractual commitment for rights to production data and an agreement to license whomever the Government designates to produce the weapon system during any or all production runs, following the initial production by the developer. The basic idea of directed licensing is to bring competition to bear after the uncertainties of R & D and early production have been resolved. The developer would agree to provide a data package and such technical assistance as may be required to get the new contractor into production. The development contractor would be compensated for his efforts by fees and royalties agreed upon at the time of the initial commitment [46:V-VI].

In a recent DAR draft revision addressing second sourcing methods, direct licensing was defined as:

> A special provision included in a contract with the developer source that specifies a firm requirement that the developer license the production of later quantities to another source [47:4.702.4].

The significant feature of this definition is the term being defined. The strategy, now referred to as direct licensing, implies that the licensor will select the licensee, subject to Government approval. By giving the developer this responsibility, the Government made DOD's licensing strategy more palletable to prime item developers.

The following definitions of direct licensing were derived from the interviews listed in the Selected References section of this thesis. In keeping with the established criteria of retaining confidentiality of the interviewees, references to individuals will not be indicated.

One of the most current and complete definitions of direct licensing was stated by an individual with many years of hands-on experience in licensing. Attached to the contracting division of a major program office, this person provided the following definition.

> Direct licensing is a scenario whereby the Government either by direction or by choice of contractor (and subsequent Government approval) permits a prime item developer to enter into an agreement with another producer, either domestic or off shore, to absorb the technology inherent in the fabrication and support of the product, develop the capability to produce, qualify under the management of the prime item developer, to produce and deliver the item, and then to commence full-scale production either as an identical producer or as a subcontractor of the prime.

Three significant points, not previously mentioned in any definition, surfaced in this definition. First, licensing can be employed domestically or in foreign countries. As will be noted in Chapter III, many licensing arrangements between U.S. and foreign firms have occurred in the past 20 years. Secondly, the licensor is responsible to

qualify the licensee as a certified manufacturer of the item. Thirdly, the Government has the option to purchase the item either directly from the licensee or indirectly from the licensee through the licensor. In the latter method, the licensee is acting almost like a subcontractor.

The next definition of direct licensing was proposed by an individual who headed up a contracting office. It supplements the previous definition by providing a reason why direct licensing may be employed. He not only said that this strategy is utilized to obtain price competition (production competition) but he went one step further and mentioned that the complexity of the item may require the licensor to provide more information than a normal data package would furnish. This factor will enter the decision process when it is discussed in Chapter IV.

> Direct licensing is a concept for introducing price competition in the reprocurement of an item which is too complex to transfer the data to the second producer by more conventional means. This process provides for technical liaison between the developer and follow-on producer.

The following definition, provided by an attorney who has several years of experience in writing, interrupting and assisting in the administrating of license arrangements for DOD, offers another reason why direct licensing may be selected as an acquisition strategy.

> Direct licensing is when a company owns some or all of the rights to the data and the Government has to pay to transfer the rights to produce the item to another manufacturer.

As one can see, the legal aspect of who owns the rights to the data is the foundation of this definition. Since this also is a factor concerning a licensing strategy, this point will be discussed in Chapter IV.

Broadening the previous definition slightly and removing the legal overtones, the following definition is offered by a highly regarded person

in the acquisition arena who is responsible for creating and approving acquisition policy within DOD.

> Licensing in its broadest sense says that in return for a consideration paid to the prime item developer, that someone else can produce your product.

An interviewee very familiar with DOD acquisition policy defined a licensing arrangement in an unusual way.

> A licensing arrangement is like a franchise. The developer authorizes another firm to build the equipment using the developer's data, patents and processes, providing that you sell only in your territory. A licensing arrangement is merely a way of transferring ability or knowledge from one contractor to another source, but not for the purpose of competing against one another, but for the purpose of satisfying manufacturing requirements for other customers at other locations.

The idea of restricted sale regions may be applicable to foreign sales but does not seem germane to a licensing agreement between two U.S. firms for the manufacturing of DOD weapons. The Government would require the licensee be allowed to sell to the applicable DOD agency, wherever it may be located.

Due to the many similarities between direct licensing and leader-follower acquisition strategies, interviewees were asked to clarify how these two strategies differ.

An attorney responded to the differences between the two strategies by saying:

> With licensing, you are selling/renting something you own; leader-follower is insensitive to proprietary interests.

Here again the significant feature of a licensing arrangement, as viewed legally, is who owns the data or information.

Reinforcing the above position, a director of a DOD contracting division stated:

> The biggest difference in implementation of leader-follower and direct licensing is the issue of who owns the rights and data.

In the following statements, a very important distinction between the two acquisition strategies is pointed out. These points are made by two contracting people in separate program offices.

> In a direct licensing arrangement, the prime contractor provides the licensee with the know-how and data to build the item, but the prime retains the design philosophies and the decision process that went into creating the item. Therefore, the licensee is not truly an independent producer. However, with leader-follower, the follower is a stand-alone producer and the leader may well be required to resign design responsibility for the item in the future.

> In a direct licensing situation, the prime design responsibility is never relinquished by the developer. He keeps it forever. In a leader-follower strategy, design responsibility may be relinquished.

The significant difference addressed above deals with design responsibility and design philosophies. The impact of the licensor retaining this responsibility and information will be discussed at length in Chapters V, VI, and VII.

Reviewing these definitions and philosophies on licensing, one can quickly gather some basic ideas on DOD's licensing strategy. The first point which requires clarification is the difference between direct and directed licensing. Direct licensing refers to a licensing arrangement established by the Government but the actual license is between the prime developer (licensor) and another firm (licensee). In direct licensing, the selection of the licensee, subject to Government approval, rests with the prime developer. Directed licensing, on the other hand,

would be identical to direct licensing except the Government selects and directs who the licensee will be. When the idea of licensing first appeared in DOD acquisition literature, directed licensing was in vogue. However, due to resistance in working with an undesirable licensee (the firms are arch competitors, enemies, or just distrust each other), the Government backed off from its policy of selecting the licensee [49]. Current domestic DOD licensing strategies allow the developer to select the licensee, subject to Government approval.

The intrinsic concept of a licensing arrangement addresses the ownership of rights, property or data. If a contractor owns some information or know-how and the Government requires that knowledge to establish a second source, direct licensing most likely should be considered. Due to the high complexity of today's weapon systems, technical assistance and know-how must be an integral part of the licensing arrangement. The prime developer who participates in a direct licensing arrangement expects to receive two types of payments: (1) a technical assistance fee for actually helping the licensee to become qualified, and (2) a royalty fee for recoupment of lost potential income and developmental costs. One can expect these fees to be substantial [25:2-3].

The prime item developer will not give up his design responsibility, or design philosophies, because these need not be known by the licensee to produce an exact copy. Because design responsibility is retained by the licensor, the licensee can never be a truly "independent, stand alone producer".

Based on the foregoing, the researcher finds it necessary to establish a working definition of the concept of direct licensing. Direct

licensing is thus an acquisition strategy utilized to create a second source when a prime developer (licensor), owning rights to intellectual property vital to a second sourcing endeavor, agrees to provide technical assistance to another manufacturer (licensee) in such a manner that the licensee becomes a qualified producer of a specific item. In return for this, the prime item developer normally receives consideration in the form of technical assistance fees and royalty fees.

G. SUMMARY

This Chapter presented the basic concepts and framework necessary to understand and appreciate the factors and elements of the environment to which any DOD licensing strategy will be subjected.

The environment which all major weapon system acquisition strategies must function within is the acquisition process. This process, which contains several phases and decision points, spans the spectrum from initial mission need requirements through the designing of the system and then finally to the manufacturing and deployment of the weapon system. The philosophy of competition permeates the entire acquisition process. By fostering a competitive environment, the Government forces perspective contractors to sharpen their pencils not only to provide a technically challenging design (design competition) but also to produce efficiently and at a fair and reasonable price (production competition). By employing these two distinctive types of competition, a PM can achieve DOD's policy of creating and maintaining competition where practicable throughout the entire acquisition process.

Although second sourcing enables the Government to have production competition during Phase III, it must be planned and arranged for

in the earlier phases of the acquisition process. Second sourcing may be embarked upon for a number of reasons including:

1. Reducing costs.
2. Broadening the production base to:
   a. maintain advanced technological production sources.
   b. ensure a mobilization base is present.
3. Develop new contractors for future requirements.

A second sourcing method known as direct licensing concerns itself with the ownership and use of intellectual property (IP). Of all the different types of IP recognized today, only patents, data and know-how play a significant role in DOD. Currently, the DAR allows for the acquisition of data and patent rights in two situations: (1) for effective operation and maintenance of the acquired system, and (2) for reprocurement of the system. The DAR lacks any authority to obtain know-how. Additionally, the DAR segregates IP into limited and unlimited rights.

Finally, the Chapter presented several definitions of direct licensing and arrived at a working definition of direct licensing to be utilized throughout the remainder of this thesis.

III. BACKGROUND

A. GENERAL

This background Chapter will discuss major reports and evaluations found in the literature including studies accomplished by the General Accounting Office (GAO), the Office of the Secretary of Defense (OSD), the Commission on Government Procurement (COGP), and the Rand Corporation. The Chapter will conclude by reviewing some licensing techniques employed by DOD agencies in prior years.

B. THE PROPOSAL

Directed licensing first surfaced in the DOD acquisition environment during June 1968 hearings before the Senate Subcommittee on Antitrust and Monopoly when Mr. Robert E. Johnson of the Rand Corporation conversed with the Subcommittee on the subject of "Competition in the Procurement of Military Hard Goods". Attempting to foster an idea, Mr. Johnson proposed the following [54:1]:

> Improved access to aerospace production technology appears to be a prerequisite to any major increase in competition. There is at least one policy innovation that would provide better access to technology and supplement present technical policies. This innovation involves provision for the licensing of production technology as a precondition of Government R & D contracts, under which the Government could designate a license at the reprocurement stage if transfer were deemed desirable. The nature and flow of technology would be patterned after commercial techniques and arrangements to the extent possible.

In his testimony, Mr. Johnson elaborated on commercial licensing stating that private companies have employed this means of technology transfer successfully for years. He also indicated a recent increase in

international licensing arrangements between U.S. and foreign firms and governments [54:1].

This proposed acquisition strategy assumes that upon conclusion of an R & D effort funded by the Government, the contractor, in possession of "a unique bundle of technology", tends to be "the only feasible source of supply". The government's normal method of acquiring the technical data and the associated rights does little to counter this "monopoly power" the firm possesses in the production of the item. Mr. Johnson thus proposed that the directed licensing arrangement be imposed as a precondition to the award of all R & D contracts [54:1].

In November 1968, Mr. Johnson formally published his thoughts on licensing in a Rand study entitled Technology Licensing In Defense Procurement: A Proposal. This study enumerated upon his Congressional testimony.

C. OFFICE OF THE SECRETARY OF DEFENSE EVALUATES DIRECTED LICENSING

The Senate subcommittee asked the Office of the Secretary of Defense (OSD) to evaluate the directed licensing strategy. OSD officially stated their position in a "White Paper on Directed Licensing" [54]. OSD concluded that although such a process may be appropriate in certain strategies, it could not be unilaterally applied to all R & D contracts. No contractor in his right mind will design the best system there is just so he can hand it over to his competition [54:1-2].

The points made by OSD in the "White Paper" concerning the disadvantages of licensing are summarized below [54:3-7]:

1. Industry attitudes - Licensor is unwilling to surrender his

trade secrets to a single real competitor. The experiences of past agreements for technical assistance with firms abroad offers little indication of industry's willingness to license its competitors to produce in the U.S.

2. Size of system a limiting factor - There is a limit on the size of a system which could be licensed. A directed licensing agreement has the potential for a host of subcontractor problems.

3. Economic judgements - It will be difficult to negotiate a fixed amount for a royalty early in the developmental cycle. One must decide what amount of royalties will be offset by the savings resulting from future competition.

4. Selecting the second source - Due to extensive proprietary data, a complete bid package could not be made available to bidders. A substitute bid package, purged of proprietary data, may not afford offerors a thorough basis for cost estimates.

5. Question of need - There is a question whether the need to license the proprietary data is a valid one. Once the Government has obligated itself to a licensing arrangement and an agreed to royalty, it may discover that it's paying the developer unnecessarily.

6. Government position awkward - Because of directing the licensing arrangment, the Government will find itself involved in negotiating the terms of the license.

7. Risk of technological retardation - The Government must assume the risk of retardation of the technological advancement of a system. A contractor, aware of the possibility that he may be required to license away all the technology necessary to produce the system, is

placed in an inherent conflict of corporate strategy. The temptation will be present to avoid using or incorporating the best of his privately-developed technology into the item, and to substitute only that information which he is willing to give away to a competitor.

8. Uncertainty of second source - Uncertainty exists in the ability of a second source to acquire and effectively utilize the data and know-how provided to him by the developer. The Government may not be able to fix responsibility for failure on either the licensor or the licensee.

The OSD "White Paper" listed the following advantages to a licensing strategy [54:7-9]:

1. Competitive atmosphere - Licensing could exert a downward pressure on the price of production quantities.

2. Creation of options - A provision for licensing in early developmental contracts allows the Government a choice of producers in the later production phase.

3. Government disengagement - A licensing approach would partially remove the Government from the typical "go-between" role required with a reprocurement data package.

The OSD "White Paper" stopped short of rejecting directed licensing. The conclusion of the position paper stated [54:9]:

> Directed licensing of proprietary information must be fairly and selectively applied and carefully tailored to appropriate situations, rather than broadly imposed as a condition to doing business with the Government.

D. GENERAL ACCOUNTING OFFICE'S APPRAISAL OF LICENSING

In addition to requesting OSD's opinion on directed licensing, the Senate Subcommittee asked the General Accounting Office (GAO) to

evaluate the proposed strategy. In July 1969, GAO released its report with less than an enthusiastic endorsement for directed licensing [25:1]. GAO pointed out that directed licensing attempts to resolve the complicated problems associated with transferring technology from one firm to another by means of technical data. Expounding on technical data transfer, GAO provided an in-depth review of technical data transfer problems. Due to the extremely important role that transfer of data plays in reprocurement and how directed licensing strives to improve the transfer process, a brief summary of GAO's comments seems germane [25:37-40].

1. Although the Government contracts early in the developmental stage for technical reprocurement data, the data obtained is insufficient to expedite a competitive reprocurement process in most cases. The deficiencies stem from many causes:

a. Data may not be pertinent - The critical factors required to manufacture the item may not be reduced to paper. Such factors as craftsman's skills, ingenious processes, "tricks of the trade", and esoteric shop practices may be left in the minds of individuals instead of being written down.

b. Restrictions by proprietary rights - Since much of the necessary reprocurement data may be encumbered with proprietary rights, the data is unavailable to potential bidders or for inclusion in the reprocurement data package.

c. Incompatible data - Rapid advances in equipment used to interpret and transfer data may make data from one firm meaningless

to another. Also unique company processes may not be adaptable to another firm's production operation.

d. Lack of technical assistance - Engineering liaison, an essential feature of successful commercial technology transfers, is seldom employed in the reprocurement of the highly complex defense industry.

GAO stated that directed licensing attempts to circumvent the problems associated with the standard DOD manner of transferring technical data by diminishing the Government's role as a conduit for data and by making the licensor responsible for the transfer of data and know-how [25:40]. In evaluating this new strategy, GAO reached conclusions that were in line with OSD's comments. GAO, however, went one step further and discounted the directed licensing strategy completely by stating in part [25:51-52]:

> Despite its innovative attack on the elusive and complex problem of transferring technology from one firm to another at reprocurement time, there are faults in this strategy that seem to evade a workable solution. Motivating the contractors to cooperate, setting the magnitude of the fees, protecting trade secrets acequately, securing straight-forward bidding procedures, possible restructuring of defense industries, and maintaining R & D freedom of the engaged firms are some of the more visible difficulties...In sum, we doubt that Directed Technology Licensing as proposed would be an effective procurement strategy. Leader Company Procurement coupled with technical assistance contracts or Second Sourcing is probably a better route to competition when the reprocurement situation suits their use.

E. THE COMMISSION ON GOVERNMENT PROCUREMENT

The Commission on Government Procurement (COGP) (1972) also researched techniques to be employed to increase the potential for competition in product contracts [35:pt.11(1)].

In elaborating on current and past methods utilized by the Government to instill competition in the production phase, COGP discussed directed licensing and its potential benefits [35:pt.11(1)183].

> The conceptual objectives of directed technology licensing are to effect transition from development to production in a climate that simulates somewhat conditions which apply to the free enterprise marketplace...While this approach does not offset entirely the many advantages gained by the R & D contractor, nor guarantee the cooperation required of the initial producer, it does warrant consideration, particularly as it may contribute to:
>
> - Establishing additional sources for downstream follow-on requirements;
>
> - Achieving economies in production that can be related to competition or other factors;
>
> - Motivating the R & D contractor to achieve better performance within cost, performance, and schedule constraints during the development period to soften the agency's desire to use the directed technology licensing approach.

The Commission summarized the disadvantages of directed licensing by referring to and restating GAO's list of difficulties enumerated in their 1969 study evaluating directed licensing. Although COGP recognized directed licensing as an alternative to sole source producers, it fell short of recommending directed licensing as an answer for creating competition for follow-on production. The Commission's study group on "Competition For Follow-on Production" recommended that parallel undocumented development (PUD) be evaluated and utilized when acquisition strategies permit. The Commission defined PUD as "the practice of employing two or more contractors to design and proceed with the development of breadboards or prototypes well into the period of engineering development" [35:pt.11(1)182]. The objective of this strategy is to instill competitive conditions in the design and development efforts prior to selecting the sole contractor for production.

It is apparent from the Commission's recommendation that during the early 1970's the distinction between design and production competition was not recognized. It was believed that competition in the early stages would instill better production prices downstream. Due to this attitude coupled with the envisioned disadvantages of directed licensing, COGP did not endorse directed licensing as the way to increase production competition [35:pt.11(1)182-189].

F. A RAND STUDY EVALUATES LICENSING

In December 1974, another Rand study emerged on the subject of licensing; An Evaluation of a Proposed Technique For Reducing the Procurement Cost of Aircraft [46]. In this study, Gregory A. Carter reviewed Johnson's ideas on the acquisition strategy and then completed several in-depth case studies of international licensing arrangements in the aircraft industry. The cases reviewed supported the concept that licensing was a technically feasible way to introduce competition into airframe procurement and recommended that the directed licensing concept be tested both in domestic DOD airframe industry and in other DOD industries [46:1-89].

Carter discussed in his study an interesting fact which had previously gone unmentioned in the literature. While providing a review of prior licensing arrangements, Carter observed that during both World War II and the Korean War, extensive licensing agreements were employed for the sole purpose of increasing production rates in times of national emergency. Although Carter recognized the ability of a licensing arrangement to provide for an expanded production base, the potential

of this aspect to licensing was down played. Carter envisioned the role of directed licensing in DOD's acquisition arena only as a method of price reduction, and did not attempt to promote other beneficial aspects of the acquisition strategy [46:15-16].

G. THE AIR FORCE PURSUES LICENSING

Until the mid 1970's, licensing in DOD was primarily employed in the foreign marketplace. In 1975, the Air Force's Space and Missile Systems Office (now known as the Space Division), utilized a licensing option clause in two contracts. These contracts, for Defense System Communication Satellites, contained a clause entitled "Unpriced Option for the Government to Acquire Patent Rights, or to Direct Licensing" (see Appendix B). The clause provided the Government with the option to [23:pt.II,7]:

> 1) Acquire a license under any patents owned, or hereafter acquired by the contractor or any subcontractor to produce, operate, maintain or modify any item component, process, or computer software, produced, used or delivered under this contract.
>
> 2) Direct the contractor to furnish technical assistance, as defined in this subparagraph, to the Government or to licensees named by the Government during the performance of this contract and for a period of ten years thereafter. Technical assistance means such technical and other data, technical analysis and advice, training, special tooling, and any other assistance necessary for the licensee to produce, maintain, operate or modify any item or component produced, or any process or software used under this contract [23:pt.II,7].

The creation of these clauses stemmed from a problem that had recently been encountered by Space Division. The problem which spurred the option clauses involved a malfunctioning satellite that was in orbit. The Government went to the manufacturer of the particular

satellite and asked for the laboratory test data which was conducted on the item prior to its launching. The Air Force hoped to discover the cause of the malfunction and what corrective action should be pursued. Unfortunately, the contractor told the Government that the test data belonged to the firm and would not release it, a situation which the Air Force did not particularly enjoy [120].

To ensure this situation did not accur in future contracts, Space Division developed clauses which would: (1) allow the Government at the beginning of the contract to predetermine who owns what data and rights, and (2) provide a method of obtaining access to limited data and information which the Government may need to obtain and review in the future. Space Division's main objective for the clauses was not to stimulate competition in reprocurement but rather to ensure that when a system was out in the field (in orbit) that it operated properly and if problems occurred, the Government had an avenue to all the necessary data and know-how to correct the situation [120].

Space Division, being a component of the Air Force Systems Command (AFSC), maintained a liaison with AFSC concerning the use of their optional "J" clauses. In October 1975, AFSC, noting the potential of the clauses, drafted proposed supplements to the DAR. These proposed supplements were routed internally to AFSC personnel to inform them of the ways in which Space Division had dealt with the typical problems arising in contracts for the acquisition of technical data. In this draft, AFSC proposed a method of obtaining access to limited data [68].

DAR allows a Contracting Officer to negotiate with a contractor to acquire unlimited rights in any limited rights technical data provided he makes the following findings [37:9-202.2(f)]:

> (i) there is a clear need for reprocurement of the item, component or process to which the technical data pertains;
>
> (ii) there is no suitable item, component or process of alternate design or availability;
>
> (iii) the item or component can be manufactured or the process performed through the use of such technical data by other competent manufacturers, without the need for additional technical data which cannot be purchased reasonably or is not readily obtained by other economic means; and
>
> (iv) anticipated net savings in reprocurements will exceed the acquisition cost of the technical data and rights therein.

AFSC pointed out that if it is difficult to make the required findings prior to contract award, then an option to acquire data and rights, or to direct license may be appropriate. Upon exercising the option, the findings required by Specific Acquisition should be made [37:9-202.2(f)]. Through this licensing option, AFSC provided a logical method to obtain the needed rights.

After more than three years and several more contracts with special "J" clauses, AFSC released a policy letter discussing "J" clauses (see Appendix C). This letter, entitled "Contracting and Manufacturing, Policy Letter: Options to Acquire Technical Data, Computer Software and Rights", spelled out two ways that the Air Force could use its bargaining power to obtain what it needed, yet pay a fair and reasonable price for it. One of the "J" clauses, "Predetermination and Option For Technical Data, Computer Software, Technical Assistance, and Rights", takes the standard DAR predetermination of

rights in technical data clause and expands upon it. By this expansion, AFSC allowed for the pre-priced option of licensing and technical assistance where the contractor would not provide unlimited rights to the Government. In this clause, the contractor may specify certain data which is excluded from any type of licensing option [43].

The second "J" clause, "Contractor Agreement to License and Assist Government Designated Parties To Use Contract Products For Government Purposes", permits the Government the option to require the contractor to grant a non-exclusive license to other domestic contractors for the sole purpose to produce the system (subsystem) for sale to and use by the Government. This unpriced option also arranged for technical assistance. The use of these "J" clauses by AFSC divisions was encouraged when unlimited rights would not be provided to the Government [43].

H. PUBLIC LAW 94-361

In November 1975, the Assistant Secretary of the Air Force (R & D) informed the Under Secretary of Defense for Research and Engineering (USDR&E) of the different innovative data clauses the Air Force had utilized. These clauses stirred up much interest in USDR&E (see Appendix D). This interest culminated in Public Law 94-361 Sec. 805 (see Appendix E). This section of the Law required that during the period 1 October 1976 to 30 September 1978 all military contracts entered into by DOD for development or procurement of a major system shall include a deferred ordering clause. This clause gave the procuring activity the option to purchase technical data packages which were in

sufficient detail to enable the Government to reprocure the system or subsystems from another contractor. Although this Law closely resembled the AFSC's clauses, two distinct dissimilarities were obvious: (1) the new Public Law was required to be included in all major weapon systems contracts, and (2) it did not allow for any licensing or technical assistance.

Public Law 94-361 came into being as a rider to the fiscal year 1977 Appropriation Bill. The Law received so much violent opposition from industry that the Law, and the complementing DAR clauses (see Appendix F) vanished from existence exactly two years after their creation [106].

I. THE ARMY PURSUES LICENSING

The Material Development and Readiness Command, Department of the Army (DARCOM) has, for a number of years, utilized Title 10, USC 2386 to procure proprietary data (see Appendix G). This code allows for DOD appropriated funds designated for making or procuring supplies to be used to acquire: "1) licenses under copyrights, patents, and applications for patents; and (2) designs, processes, and manufacturing data" [33]. Employing this strategy, DARCOM reaps several advantages including: (1) covering all aspects of transferring technical data, (2) avoiding extensive controversies over data rights, (3) permitting the PM to know where he stands with data, and (4) buying only the rights that are required. To date, only the Army has utilized the 10 USC 2386 route [90].

J. SUMMARY

Licensing as an acquisition strategy was first introduced into the DOD acquisition arena in 1969 as a proposal to create price (production) competition for major weapon systems. The impetus behind the directed licensing proposal was to require all R & D contracts for major weapons to contain a clause which allowed the Government to select the licensee and direct the prime item developer to pursue a license arrangement with the specified licensee upon entering the production phase of the acquisition process.

OSD, GAO, and the Commission on Government Procurement reviewed the directed licensing proposal and, although the potential of the strategy to overcome many of the problems associated with reprocurement data packages was recognized, they discounted the strategy as a viable method of obtaining production competition due to its many major stumbling blocks.

A Rand study, published in 1974, presented an in-depth review of several international licensing arrangements in the aircraft industry. This study down-played the idea of utilizing a licensing arrangement to create a directly competitive situation. Instead, it pointed out that there are other very unique features and benefits resulting from a licensing strategy; such as foreign military sales and increasing the domestic production base.

The Air Force experimented and refined several licensing clauses, similar to DAR's deferred ordering of data clause, which allowed the Government the right to require the prime to license another firm of their choice (subject to Government approval). Although these clauses

were aimed at obtaining access to the developer's data and information to correct problems which developed in the field, the clauses are applicable to the reprocurement effort as well.

The use of Title 10, USC 2386 by the Army was presented. This authority to utilize a license arrangement to gain access to the contractor's proprietary data has enabled the Army to successfully obtain second sourcing for a number of systems.

Drawing on past licensing programs and available second sourcing literature, the next chapter will delve into the decision-making process that a program manager (PM) must undertake when initially contemplating his acquisition strategy. The factors and objectives that might cause a PM to consider a licensing strategy will be discussed at length.

IV. THE LICENSING DECISION-MAKING PROCESS

A. GENERAL

Once a program enters Phase 0 of the acquisition process, the newly appointed program manager (PM) assumes responsibility for the recently established program. One of the PM's immediate tasks involves the development of an acquisition strategy. The PM, with the assistance of the Procuring Contracting Officer (PCO), decides how the Government will obtain the weapon system and its subsystems. The goals, objectives, and the unique characteristics of the program all greatly influence the acquisition strategy.

In an attempt to assist the PM and the PCO with this decision-making process that culminates in the creation of the acquisition strategy, several decision models have been developed. This Chapter will review and comment on two such models. Following the discussion of these models, additional factors in the licensing decision will be presented. The Chapter will conclude with a summary of the benefits and disadvantages of direct licensing.

B. SECOND SOURCING METHOD SELECTION MODEL

A recent research endeavor created a second sourcing method selection model (SSMSM) which was developed to aid the PM and/or the PCO in determining: (1) whether or not it was feasible to generate a second source, and (2) which second sourcing method was best suited for a given acquisition [65]. The model, jointly developed by

Lieutenant Commanders Parry and Sellers, enumerates 14 critical variables that affect the second sourcing decision. The 14 factors as presented in the SSMSM are discussed below [65:63-78].

1. QUANTITY OF THE BUY - The total quantity to be acquired and the rate at which DOD places the production requirements will significantly influence the cost effectiveness of establishing a second source. If the quantities are minimal, the potential savings from qualifying the additional source to produce or compete for the low quantities probably will not justify the associated expense. Only in the case where the magnitude of the price of the weapon system or subsystem is truly larger will small quantities justify the use of a second sourcing arrangement. The greater the quantity of the buy, the more feasible this strategy becomes. This occurs because the potential savings created by production competition increases with the number of units to be procured.

2. DURATION OF PRODUCTION - The longer the duration of the production, the more feasible any second sourcing effort becomes. Getting a second source tooled up and qualified to manufacture an item requires time. If the duration of the buy is not significantly longer (by several years) than the time required to qualify the source, then a second sourcing strategy may be inappropriate.

3. SLOPE OF THE LEARNING CURVE - The flatter the slope of the learning curve, the more appropriate a second sourcing endeavor becomes for that system. A firm with a step learning curve reduces its production costs significantly with each unit it manufactures prior to having a qualified source. The cost differential created by this

learning makes it extremely difficult for the second source to price competitively with the initial producer. One word of caution; A steep learning curve may be indicative of an unrealistically high initial price. Proper initial negotiating procedures should avoid this situation.

4. TECHNICAL COMPLEXITY - The greater the complexity of a system, the more essential close liaison between the prime item developer and the second source becomes. Typically, the technical data package for a highly complex system will be insufficient to allow the second source to manufacture the item without a considerable amount of engineering and production liaison. Several authors have recognized that a successful licensing arrangement provides this needed liaison through technical and know-how assistance [46].

5. STATE-OF-THE-ART - If the technology utilized in the system is at or pushes the state-of-the-art, the greater the need for cooperation between the original and second source manufacturers becomes.

6. OTHER GOVERNMENT OR COMMERCIAL APPLICATIONS - Where there are envisioned to be significant alternative applications for the system, the developer may claim or generate barriers to the dissemination of his design through the use of patents, trade secrets, or proprietary data. The literature indicates that direct licensing overcomes these barriers by providing royalty payments to the developer and establishing specific limitations on the use of the developer's information to prevent dissemination of design by other sources [46].

7. DEGREE OF PRIVATELY FUNDED R & D - The greater the degree of privately funded R & D that a specific system or subsystem

contains, the larger the amount of proprietary data will be included in the design package. Due to the restrictive nature of proprietary data, the Government finds it increasingly more difficult to reprocure through a technical data package. Quantum of proprietary data is not as important as its substance. One critical manufacturing or production process of a truly proprietary nature could greatly hinder a second sourcing effort unless the Government gains access to the process or data.

8. SPECIAL TOOLING AND FACILITIES COSTS - With increasing special tooling and facilities requirements, the increased costs decrease the chances of bringing a second source on line in a cost effective manner. Unless provisions for Government-owned tooling or facilities are made, or unless the quantity and duration of procurement is sizable enough to allow ammortization of these large costs, licensing, as with any second sourcing endeavor, may not be the proper strategy to pursue.

9. COST OF TRANSFERRING UNIQUE GOVERNMENT OWNED TOOLING OR EQUIPMENT - When unique Government owned tooling is expensive or arduous to transfer from one contractor to another, then it may be necessary to provide the second source a duplicate set of tooling. The cost of providing or transferring this tooling can act in a degrading manner to a second sourcing effort.

10. CONTRACTOR CAPACITY - If the prime item developer does not have the ability to manufacture the desired quantities of the system at the rate required by the delivery schedule, then the development of a second source may be mandatory. Restated, the lack of adequate

capacity will be a driving factor in the second sourcing decision. On the other side of the coin, if the initial producer has sufficient or excess capacity, reduction in the original firm's production quantities increases the cost of his products due to increased overhead burden. All of the second sourcing methods are affected by this factor equally.

11. MAINTENANCE REQUIREMENTS - Although second sourcing theoretically enables both sources to produce similar items, seldom, if ever, will the items be exact duplicates. If the maintenance function is to be performed at the field level, the non-identical nature of second sourced systems could create serious logistical problems. A requirement for reliance on field level maintenance may seriously thwart any type of second sourcing.

12. PRODUCTION LEAD TIME - The longer the lead time required for the production of the system, the longer it takes to qualify a second source and the less beneficial the second sourcing effort becomes.

13. DEGREE OF SUBCONTRACTING - Given a situation where the number of qualified subcontractors is limited and a heavy reliance is thus placed on those subcontractors, the benefits of second sourcing will be necessarily lessened. This occurs because the newly acquired source may be forced to compete with the developer for the services of the same contractors, or obtain materials from a single supplier. Such a scenario may result in higher prices for these commodities.

14. CONTRACTUAL COMPLEXITY - The greater the complexity of the contractual relationship between the Government and the original producer becomes, the more significant are the barriers to a successful second sourcing. Complex contractual issues like life cycle cost

parameters, reliability improvement warranties, and value engineering become difficult to enforce when dealing with additional sources. This problem is common to all methods of second sourcing.

The objective of the second sourcing method selection model (SSMSM) was to provide a logical and systematic method for evaluating the suitability of each of five different methodologies to create a second source in light of the previously described variables. Evaluating a particular acquisition situation against the 14 factors should greatly assist the PM and/or PCO in the decision-making process regarding whether to select a direct licensing strategy. It should be noted that in evaluating a specific system or subsystem, one or two of the variables may turn out to dominate all the other factors. In this situation, a significant weighting factor in favor of the dominant item should shift the evaluation in the appropriate direction.

In the presentation of the SSMSM (see Appendix H), LCDR Parry pointed out that new variables or factors should be added to the model as a PM recognizes them. Later in this Chapter, some additional factors pertaining to a licensing strategy will be added to this model. Additionally, Chapter VII will present a licensing decision model which draws on the variables discussed in this Chapter, supplemented by cases and an analysis of the decision-making process found in the chapters to follow.

C. THE LEADER/FOLLOWER DECISION MODEL

In another recent research endeavor, a four stage decision model created to assist in the determination of whether a leader/follower

acquisition strategy should be embarked upon, was presented by Thompson and Rubenstein [72] (See Appendix I). The first stage of the model consists of determining if second sourcing is necessary. The four factors which, according to the model, influence the second sourcing decision are discussed below [72:14]:

1. PRESENCE OF SOME OBJECTIVE - Typically, a program that may be a candidate for second sourcing contains an overriding objective to be advanced or achieved through the establishment of a second producer. Although any one of several objectives could conceivably exist, two have historically dominated the scene:

a. The objective to assure that the supplier can in fact satisfy the quantity and production rate of the Government's requirements.

b. The objective to reduce the overall cost of the buy or program.

2. CHARACTERISTICS OF THE PROCUREMENT - Two key variables, sensitive to the assurance of supply, affect the procurement factor:

a. Size of the buy.

b. Schedule of delivery.

3. TIME - This third factor influences the second sourcing decision in two ways:

a. Sufficient time must be available to allow for the development of the second source. There is a significant inter-dependency on the objective and the characteristics of the particular procurement factors. Obviously if insufficient time is available to develop a second source, second sourcing should not be pursued.

b. The second facet of the timing factor centers around how early in the acquisition process the second sourcing decision is made. The lead time required to qualify the second source must be consistent with the time of need.

4. OTHER - This factor is a catch-all for other environmental pressures on the acquisition. A strong policy directive could dictate a certain acquisition strategy and as such could over-power the other factors.

The second stage of the leader/follower decision model commences with the decision to second source. Only with an affirmative decision to second source will the decision to utilize a leader/follower acquisition strategy be evaluated. This leader/follower decision involves three significant factors [72:14-15]:

1. COMMONALITY - It is assumed that the initial and second sourced end products will be identical or nearly so. If it is desired that the systems to be procured from multiple sources need only meet minimal functional requirements (form, fit, and function), then it may be wasteful (and possibly undesirable) to insist upon a transfer of manufacturing data and know-how between the developer and the second source.

2. REPROCUREMENT DATA BASE - The most critical determinant of the feasibility and/or the desirability of a leader/follower acquisition strategy rests within this factor. If the data base available to potential second sources is "so complete" that they can produce the item without "extraordinary" assistance from the developer, there exists no need for the leader/follower strategy. On the other extreme, if the available

data base is so inadequate or the item is so difficult to produce, the developer may find himself so drained attempting to produce the system that no assistance can be offered to the second source. The leader/follower strategy would be very apropos for the situation where the data base falls between these extremes and would thus allow the leader to provide "extraordinary" assistance to the follower.

3. CHARACTERISTICS OF THE CONTRACTORS - The significant concern of this factor focuses on the willingness and the ability of both the leader and follower.

4. OTHER - Other considerations or factors may also affect the leader/follower decision. Such things as the appropriateness of alternate strategies and other overriding priorities may dictate a different decision than would be concluded from the previous factors.

The third stage of the leader/follower decision model consists of a detailed analysis of the specific objectives of the acquisition under consideration. If the achievement of savings in cost is a prime objective, then a cost comparison should be completed. On the one hand, is the anticipated cost savings to be realized through price competition? On the other hand, are those costs attributed to creating the second source? Examples of the latter include the Government's costs, cost of the assistance provided by the leader to the follower, and the start up costs of the follower. The larger the quantities and the longer the duration of the production run, the more likely the cost savings will materialize [72:15].

If the objective of the program involves the assurance of supply (availability), then the primary basis for establishing a second source would revolve around the following reasons [72:15]:

1. The desire to develop or maintain a mobilization base.

2. The quantities scheduled to be delivered exceed the present capacity or capability of the producer.

3. The anticipated circumstances which may change or interfere with the original producer's ability (or willingness) to produce within desired ranges of cost, schedule, and performance for the entire life of the program.

The goal of achieving availability requires the creating and maintaining of more than one source.

The final stage of the leader/follower model addresses the implementation of the specific strategy. The earlier the consideration and planning for a leader/follower arrangement, the better, because this not only facilitates the strategy's later use, but it also provides the contractor lead time to plan for the concept. If the objective of the original strategy centers on availability, delaying the second source decision could jeopardize the entire project. Funding for the project may be available only during a certain "window", or time period. Not having the necessary sources on line when the funding is required to be obligated may subject the program to drastic budget cuts. If the objective strives for cost savings, the sooner the decision to second source is made, the greater the potential savings and the more cost effective the strategy becomes [72:16].

The second implementation decision involves the form of contractual arrangement to be utilized. Three forms may be employed: (1) through a subcontract from the leader to the follower, (2) through separate prime contract (with the prime developer contractually required

to assist the follower), or (3) through a subcontract from the follower to the leader for assistance [72:17].

Incentivizing the contractors to successfully pursue the second sourcing effort is the third implementation decision. Some type of financial incentives, perhaps tied to progress payments and delivery schedules, should provide the incentives necessary to assure: (1) that the leader furnishes the required manufacturing assistance and know-how, and (2) that the follower accepts this information in such a way that he qualifies as a certified manufacturer within a specified time-frame [72:17].

The last implementation consideration is "other factors". The possible use of other acquisition strategies to reinforce the Government position or to expedite a critical policy or objective would be one example of such a consideration [72:17].

Although the previously described model applies specifically to leader/follower, the many similarities between leader/follower and direct licensing make this model also germane to the direct licensing decision. Some refinements and additional factors will be discussed next which will help to tailor the two models specifically to the direct licensing process.

D. ADDITIONAL FACTORS AFFECTING THE DECISION PROCESS

The four-tier decision model created by Thompson and Rubenstein addressed the fact that the objectives of a particular program must be accounted for. One such objective in a second sourcing effort may concern the aspect of Foreign Military Sales (FMS). FMS may be pursued for a number of reasons. Interviewees and the literature suggest that

when it is believed a program may have the potential for foreign sourcing, the PM may want to have his acquisition strategy allow for the possibility of having a foreign source produce the item [47:4.701]. The method typically employed to allow for foreign sourcing has been licensing [49]. The researcher observes that one factor not included in the Thompson-Rubenstein or the Parry-Sellers models is the potential for foreign sourcing.

Another factor eluded to in the leader/follower model and discussed in the SSMSM is the completeness of the reprocurement data. Specifically, if proprietary data, patents, or trade secrets are claimed by the developer, the reprocurement data base will most likely be incomplete and cannot stand alone. Thus if a prime item contractor states that some IP unique to the system is limited in nature, a licensing strategy should be considered as one viable method of obtaining a second source.

Another factor to be reviewed in a direct licensing strategy is the amount of funding a prime developer desires for the licensing arrangement. The amount of royalty and the price for technical assistance to be provided to the licensee may affect whether a direct licensing strategy will be employed. The majority of the interviewees expressed that if the Government cannot (or does not envision it can) negotiate a fair and reasonable royalty and assistance fee, then a direct licensing arrangement could become too costly a strategy to pursue.

Gleaning the pertinent factors and decisions from the two models presented in this Chapter and the additional factors discussed above, one can create a decision model for a direct licensing strategy. The author will develop such a model in Chapter VII, after reviewing and analyzing several DOD programs in Chapters V and VI.

E. THE ADVANTAGES AND DISADVANTAGES OF A LICENSING STRATEGY

When a PM is contemplating a direct licensing acquisition strategy for his program, in addition to consulting a decision model as previously presented, he may desire to evaluate the potential benefits and drawbacks of such an acquisition strategy. A recap of licensing's advantages and disadvantages as previously discussed in this study are summarized below:

1. ADVANTAGES OF A LICENSING STRATEGY INCLUDE:

a. The creation of a competitive atmosphere in the production phase.

b. The creation of production source options for the Government.

c. The ability for the Government to disengage from the transfer of technology between the sources.

d. The developer receives protection and maintains control of manufacturing data and procedures.

e. The developer receives compensation for allowing another firm to manufacture his item.

f. The ability to establish a second source without a complete data package.

g. The ability to establish a second source when limited IP is contained in the data package.

h. The ability to facilitate establishment of foreign sources.

2. DISADVANTAGES OF A LICENSING STRATEGY INCLUDE:

a. The presence of negative industrial attitudes towards

the sharing of trade secrets.

b. The difficulty in settling on a "proper" royalty.

c. The difficulty of selecting the licensee.

d. The difficulty in determining legal ownership of IP.

e. The risk of technological retardation in the program.

f. The risk of not successfully qualifying the second source and the inability to hold either party responsible.

g. The difficulty of motivating the developer to participate in a licensing arrangement.

h. The difficulty of protecting trade secrets.

F. SUMMARY

This Chapter presented two decision models intended to assist the PM and the PCO in the creation of the program's acquisition strategy. These models specifically addressed the second sourcing decision and the selection of proper methodology to achieve the program's goals and objectives. Both decision models discussed variables or factors which affect the second sourcing decision. The four stage leader/follower model provided a sequence of decisions beginning with the question of whether second sourcing is desired, and culminating in the implementation process.

Realizing that the two models did not address all the factors pertinent to a direct licensing decision, additional factors found in the literature and during interviews were discussed and shall be incorporated in the model to be developed.

The Chapter concluded by summarizing the known advantages and disadvantages of a licensing strategy.

The next Chapter will analyze six direct licensing cases which will serve to enforce and substantiate the factors identified previously, to bring out new factors, and to offer up different considerations for these factors.

V. ANALYSIS OF SELECTED PROGRAMS UTILIZING A LICENSING STRATEGY

A. GENERAL

This Chapter will present and analyze several programs which contain a licensing arrangement in their acquisition strategy. Each case will be discussed in a similar format. Beginning with a brief description of the system, the environment and objectives of the program, the cases will then elaborate on the factors considered that precipitated a licensing decision. Problems encountered and the achievements recognized from licensing will then be commented on. An analysis of the program's strategy will round out each case. The implications of these cases to the overall acquisition decision process will be discussed in Chapter VI.

Of the six cases presented, the last three cases involve transferring technology and manufacturing processes from a foreign firm to a U.S. firm. Although not truly a second sourcing endeavor, the mechanics are similar and the experiences gained from these cases contribute to the study.

B. JOINT CRUISE MISSILE ENGINES

The Cruise Missile is a top priority weapon in the United States' strategic arsenal for the 1980's. A national defense program of this caliber has gravitated enormous visibility from many Government agencies; starting with Congress, the President, Secretary of Defense and transcending down through to the Services concerned.

The concept of a Cruise missile can be traced back nearly a decade. Although initially the Air Force and the Navy were allowed to pursue separate Cruise Missile programs, it was dictated that a common technology base would be developed and shared.

In January 1977, the Defense Systems Acquisition Review Council (DSARC) directed that the recently established Joint Cruise Missile Project Office (JCMPO) would be responsible for full-scale development (FSD) of all Cruise Missiles (Air-launched, Sea-launched, and Ground-launched) [62:2]. This DSARC II mandated that, to the maximum extent possible, all missiles have a common engine, navigation guidance system, and warhead to accomplish their differing missions. DSARC II also directed this office to encourage second sourcing of the Missile subsystems. Further guidance was provided to the joint program in an Under Secretary of Defense memorandum which established the Air Force as the lead service for the development of a common FSD program for the Cruise Missile engine [62:2].

Later in the same year, the Under Secretary directed that all the Cruise Missile project elements, except for the engine project management and engineering functions, be co-located at JCMPO in Washington, D.C. The acquisition division thus had personal access to all the subsystem's personnel except for the engine's program personnel.

Shortly after DSARC II, JCMPO approached the sole developer of the Cruise engine (Williams Research Corporation (WRC)) with the desire to second source the engine during the production phase. The researcher learned from interviews with contracting personnel that the impetus behind this second sourcing drive stemmed from several objectives:

(1) to increase the production base because requirements exceeded the production capability of WRC, (2) to establish a mobilization base that would reduce the vulnerability of the manufacturing facilities and allow for surge potential, and (3) to stimulate and maintain competition so that the missile's costs would remain low. Being a small firm and insisting that the entire engine contained "proprietary data developed at private expense", Williams informed the program office that they would not entertain any type of second sourcing arrangement. The developer viewed JCMPO's second sourcing request as an impossible dream. They, believing the Government to have no options, felt the joint office would rescind their request and retain WRC as the sole source supplier. WRC did, however, offer to open a new manufacturing facility to satisfy the Government's demand.

Concerned for the availability of engines down-stream, the engine PCO began to aggressively solicit a second source. The PCO synopsized the engine package with the available data and prepared a Request for Proposals (RFP). On the day prior to the scheduled releasing of the RFP, Williams expressed an interest in a licensing arrangement and proposed to the agency a licensing strategy.

In April 1978, the Executive Committee (EXCOM), chaired by the Under Secretary of Defense (Research and Engineering) and responsible for providing the Cruise office program and fiscal direction, authorized the acceptance of the developer's proposal for a licensing arrangement to ensure production continuity and capability [62:2]. Discussions between the PCO for the engines and the researcher explained why the license was settled on. The two key factors that enabled Williams to

convince the Executive Committee and the project office to use a licensing agreement were: (1) WRC said they could qualify a licensee one and a half years sooner than it would take the Government to obtain another contractor through the RFP route, and (2) a licensing arrangement would save the Government about $30 million over the RFP method.

Williams Research, having the responsibility of selecting a licensee (subject to JCMPO's approval), conducted a source selection. The PCO for the engine elaborated on the difficulties associated with the choosing of a licensee. Due to the proprietary rights, the bidders were provided only two detailed drawings. They were to extrapolate the bid proposals on these two parts and arrive at the bidder's cost to produce the entire engine. WRC's initial recommendation for a licensee turned out to be completely unsatisfactory to the joint office. The original developer proposed a firm who had never produced a jet engine before. The contracting officer for the Cruise engines indicated that this non-jet-engine producer was selected for obviously selfish reasons; the licensee would take so long to become a truly qualified source that Williams would never have to worry about the licensee being a true competitor. The Government favored the low bidder, Garrett Airesearch. The licensor rejected Garrett because they would not agree to the developer's restrictive license. In short, WRC's license wanted the licensee to agree that all of WRC's data and know-how transferred to them could only be used for the Cruise engine (F107 program) in association with the JCMPO and forbade any commercial utilization of the information; and in addition, the licensee would be required to: (1) furnish to the initial producer, at no cost, new or existing technology applicable to the F107 engine,

and (2) allow WRC access to their facilities to observe all F107 operations. Teledyne, CAE (TCAE), the only source that the Government and the developer could agree upon, was selected in September 1978 to be the licensee. Williams, under the licensing program, was required to assist TCAE in establishing its manufacturing and test facilities on a step-by-step basis. The culmination of this assistance would be the certification of Teledyne by the licensor as a qualified manufacturer of the F107 engine.

The license arrangement settled on by the program office, which allowed for the licensee to manufacture and deliver these highly complex, technical and specialized engines, turned out to be a complicated document. The license provided the Government with the option to procure Teledyne's engine either through the licensor as a subcontractor or, under certain conditions, directly from the licensee [44:2]. The license provided for payment of a royalty only in the case where the Government procured the engine directly from the licensee. The license prescribed conditions for competition between WRC and the licensee. The first 20 engines per month were guaranteed to the developer, 25% of quantities between 21 and 100 per month was guaranteed to WRC, and 50% of quantities over 100 per month was guaranteed to them. In addition, the Government retained the right for direct contracting with the licensee if Williams could not produce at a reasonable price or if WRC was unable to meet the schedule or quantity requirements. Where the Government procured the licensee's engines through the developer, they could apply a predetermined rate (9-12%) to the licensee's sale price in lieu of his normal G & A expenses and profit application.

Although the license arrangement for the engines described above is less than two years old, the researcher learned through many interviews with JCMPO personnel that several problems have already been encountered. These problems include the following:

1. The Government overcame the developer's initial reluctance to license by threatening to openly compete for a second source. This leverage stimulated WRC to accept what it considered to be the lesser of two evils. Although the Government required WRC to warrant the engines produced by the licensee, no type of warrantee was employed to ensure that the licensee be qualified by a specific time. The initial producer set up elaborate milestones for data transfer and for licensee progress, but no significant leverage was afforded the Government if they failed to meet the milestones or if TCAE was not qualified on time. As a result, the licensor dragged its feet with the transferring of technical data and assistance to Teledyne. It was suggested that it has been to WRC's advantage to slow down the process because, by so doing, it guarantees itself more production units. With these additional units, WRC continues to march down the learning curve. It is estimated that Williams will have produced 200 engines prior to the licensee being qualified. The contracting shop for the Cruise Missiles acknowledges that it currently has no club or leverage to force the licensor to get the licensee qualified. JCMPO blames this occurrence on the lack of experienced Government personnel who drafted the contract with Williams.

2. Due to urgent time constraints, the Government had not been able to properly conduct a predetermination of rights with the developer

prior to signing the license agreement. Initially, WRC claimed 100% of the parts as proprietary data developed at private expense. After several years of investigation and legal interpretation, WRC now only claims proprietary rights to six parts. Although this represents less than one percent of the parts, the originally negotiated royalty fee remains unchanged. Specifically, the arrangement agreed to by the Government states "...the determination of the extent to which the Government has limited versus unlimited rights to technical data and computer software will not affect royalty payments..." [Agreement 40:1] JCMPO believes that it may turn out that the developer does not own any rights to the data.

3. Teledyne is experiencing a large cost overrun ($5 million). The Government attributes this directly to the limited information that the licensee had to base its price on.

4. The licensee must submit all discrepant hardware to WRC for testing, evaluation and recommended corrective action. The Government acknowledges that the problem stems from Williams' retaining design responsibility for the product. The Government wanted Williams Research to retain this function because they knew the complete design philosophy of each part and they were unwilling to release it to any other potential competitor. The license required WRC to transfer data and know-how to the licensee but not design philosophies. As a result, Teledyne is completely reliant on WRC to correct discrepant parts; a time consuming process.

Gleaning information from the interviews with JCMPO personnel, the researcher feels that this licensing arrangement for the Cruise

Missile engine has provided JCMPO with two very distinct benefits. First, the direct licensing strategy will save the Government about $25 million. This savings materialized because DOD did not have to pay for duplicate design and developmental costs. The second and more important point involves the time to qualify a second source. TCAE will be qualified at least one and a half years sooner than if a techical data package (TDP) would have been used. Because the licensor is contractually obligated to transfer all the data, know-how and associated manufacturing information to the licensee, the time required to get the second source on line becomes dependent only on two factors: (1) the rate the licensor transfers the IP, and (2) the rate the licensee absorbs and employs it. The Government does not have to be concerned about the lack of information available to the licensee. Because in this case practically all of the IP involved in the engine was initially claimed as limited, the Government necessarily had an extremely incomplete reprocurement data package. Without this vital information, the time required to develop a second source becomes quite lengthy. Even with a complete reprocurement data package, a licensing strategy would enable a second source to be qualified quicker due to the assistance and know-how which is readily available from the initial developer and producer. Several of the program's personnel believe that if a time constraint exists in which to qualify a second source, a direct licensing strategy should be considered as an avenue to obtain dual sourcing within a tight time schedule.

Analyzing the JCMPO's licensing strategy utilized to obtain a second source for the engines, one must keep in mind that the program

was directed to be second sourced to the maximum extent possible. In addition, the program director desired to produce a missile that would remain inexpensive to produce. Production competition was the vehicle employed to reach the goal. The specific objectives sought by the program director as provided to the researcher through the interviews in this acquisition was to provide a second source that would: (1) supplement the developer's insufficient capacity in order to satisfy DOD's envisioned demand, (2) ensure dispersal of strategic risk for mobilization concerns, and (3) keep costs down through competition.

JCMPO also realized that although the engine was not a complex item from a technical standpoint, it was very complex from a production standpoint. This difficulty to produce stems from tight tolerances within this small engine. Knowing that producability may be a serious stepping stone in obtaining a second source, the joint office preferred to utilize the licensor's liaison and know-how in creating a second source. The success of the IP transfer hinges on how well the Government can motivate the licensor to qualify the licensee. The contracting officer and other personnel familiar with the agreement realized that more of a leverage should have been included in the original contract with WRC. The project office's recommendation to prevent a future similar slow down of the transfer process is to: (1) establish firm milestones for the licensor to provide the IP, (2) establish firm milestones for the licensee to absorb IP, (3) agree to a definite date that the licensee will become a qualified manufacturer, and (4) hold the licensor responsible for the licensee's progress. An interviewee in the joint office offered one way to do this by stating that if the licensee is not qualified by the agreed

upon date, then the licensor would be contractually required to provide the units the licensee would have been required to deliver, free of charge to the Government until the licensee becomes qualified.

The delay in transferring IP to the licensee and subsequently in qualifying the second source may have been due to more fundamental reasons than just the lack of Government leverage. Specifically, the depth of management at WRC was only sufficient enough to support internal operations of the company. The researcher would observe that perhaps the extra burden of providing technical assistance to the licensee and monitoring the transferring of IP to TCAE could not be properly staffed by the licensor.

It also appears to the researcher that the lack of a dedicated unified Government team may have also contributed to the lack of Government leverage over the licensor. The dispersal of personnel between the Air Force in Ohio and JCMPO in Washington, D.C. caused the Government some confusion and most likely allowed the licensor to write a license arrangement that favored him.

The Government believed that the licensee would act like a prime contractor and would discuss problems with the Government when appropriate. Teledyne viewed themselves as a subcontractor to WRC and therefore when problems occurred with the IP transfer, they naturally went to the prime and not to the Government. The prime, in turn, did not relay these problems to the Government. The joint office has since informed both Williams and Teledyne that if the licensee has a problem, they are to inform the Government as well as the licensor. By requiring communication from the licensee, the Government can be made aware of

problems as they surface and at the same time determine responsibility and what corrective action must be initiated.

The last important point of this case concerns ownership of IP. Very seldom is it a clear issue of who owns what. Typically, the Government does not know whether or not it has clear title to all the data without an extensive legal review. Considering the time required to determine the ownership of IP, many programs could not wait for the results of this lengthy process prior to pursuing a second sourcing effort. To allow for the utilization of a licensing strategy prior to legal determination of IP ownership, perhaps some type of clause should be included stating that the amount of royalty initially agreed to will be reduced if the amount of developer-owned IP is subsequently reduced through legal review. If the developer opposes the idea of having the royalty fee be related to the final legal ruling on the amount of IP he owns, then, as one interviewee at JCMPO mentioned, there is good reason to believe the developer does not own all the IP he initially claims he does.

Although the previous program experienced many problems, several lessons were learned. In addition, the licensing strategy saved the Government significant money and enabled the Government to have a qualified source on line in a shorter period of time.

C. REFERENCE MEASURING UNIT AND COMPUTER/INERTIAL NAVIGATION ELEMENT FOR THE CRUISE MISSILE

The desire to second source the Guidance Set for the Cruise Missile stems in part from the direction provided to JCMPO to second

source all systems to the maximum extent possible. The initial consideration to second source the Guidance Set occurred in early 1978. The extensive amount of subcontracted components received from numerous suppliers and McDonnell Douglas Astronautics Company's (MDAC) complex integration task, dictated the infeasibility of second sourcing the entire Guidance Set. The largest and most expensive single component of the Guidance Set, the reference measuring unit and computer/inertial navigation element (RMUC/INE), thus became the candidate for a second sourcing effort [44:3].

The original developer and producer of the RMUC/INE, Litton, Guidance and Control Systems Division (C&GSD) was an inertial guidance subsystem subcontractor to MDAC. As such, C&GSD and McDonnell Douglas had performed a predetermination of rights prior to their initial contract, which stated that Litton's data on certain components would be delivered with limited rights. Initiated by JCMPO, MDAC discussed with Litton a licensing arrangement to allow for second sourcing. Litton flatly refused. Attempting to obtain a second source, and faced with an incomplete technical data package due to limited rights in data, McDonnell Douglas issued a form, fit, and function RFP to industry [51:3-4].

Litton, succumbing to this pressure, proposed that Litton Systems Canada Limited (LSL) be the licensee of the guidance subsystem. After reviewing Litton's proposal, JCMPO had MDAC withdraw the RFP and pursue the Litton licensing agreement. The specific acquisition strategy utilized to obtain the RMUC/INE was a leader/follower arrangement with a licensing agreement as an integral part of the strategy. In addition

to providing the lowest cost and most expeditious schedule, a licensing strategy was embarked upon by JCMPO because it [66:4-6]: (1) was the lowest risk approach since the original developer had proven his technology through rigorous tests on several manufactured systems; (2) would lower life cycle costs due to having only one design to produce and support; (3) kept the prime hardware supplier (MDAC) responsible for quality, reliability, and performance; (4) allowed for transferring of limited IP and manufacturing know-how to the second source; and (5) allowed for the utilization of common tooling and test equipment.

To ensure that all parties involved with the licensing arrangement understood the ground rules and knew what was expected of each other, a Memorandum Of Agreement (MOA) between JCMPO, MDAC, and Litton was drawn up that addressed the following:

1. MDAC and JCMPO would allow G&CSD to license LSL as the one and only second source for the RMUC/INE. This informed Litton that only their two subdivisions would be providing the subcomponent of the Guidance Set.

2. Litton G&CSD would be responsible to assist and qualify Litton of Canada.

3. Due to potential anti-trust violations, upon qualifying LSL as a second source, both divisions of Litton shall then be required to work as independent contractors with no further communications between them.

4. The Government would not pay for the transferring of technology to LSL or for royalty fees to G&CSD. That is to say, it would be a royalty free license arrangement.

5. The maximum profit level allowed to either Litton division on firm fixed-price contracts was 10% and on cost-plus-fixed-fee contracts was 7%.

No significant problems have been experienced thus far in the arrangement. There was, however, a protest by a bidder to MDAC's RFP. A firm who received the RFP, Singer-Kearfott (S/K), protested the withdrawal of the RFP on two counts: (1) that S/K was denied the opportunity to compete on an equal basis with Litton of Canada, and (2) it was improper to compare the two approaches (licensing and form, fit, and function) to obtain a second source.

The General Accounting Office (GAO) denied the protest by stating that the Government (JCMPO) had acted fairly and embarked on the strategy that would serve the country's needs in the best manner and with the least expenditure. GAO also noted that the MOA should ensure fair and independent competition exists between the two Litton subdivisions [66:40-49].

The potential for anti-trust violation precipitated much interest from JCMPO and MDAC. The Government personnel who wrote, negotiated and administrated the licensing agreement were a unified and dedicated team with the Project Manager (Rear Admiral W. M. Locke) also personally involved. Rear Admiral W. M. Locke let it be known that fair competition between the two Litton divisions must be maintained. To ensure this competition existed, JCMPO specified [66:40-49]: (1) that anti-trust laws require that the two divisions act independently without corporate management interference, once LSL becomes a qualified second source, (2) that price discussions between the two divisions is illegal

under the Sherman Act, and (3) substantial civil damages and criminal penalties would be imposed for violations of the anti-trust laws.

JCMPO also set up a "big brother" routine with the licensee. The Government informed LSL that if anything was going astray in the transferring of IP, or if their sister company attempted to slow down the process, that LSL should contact JCMPO immediately so corrective action could be initiated. This allowed JCMPO to be aware of problems when they started and "nip them in the bud". This open door arrangement and the dedicated Government management team stemmed from lessons learned from the Williams-Teledyne license arrangement.

The important issues relevant to the licensing of the guidance subsystem gained through interviews with JCMPO's personnel are summarized below:

1. The main reason a licensing strategy was pursued centered around the existence of proprietary data and know-how.

2. Significant time constraints dictated a strategy that would allow a rapid development and certification of a second source.

3. JCMPO had a dedicated management team that played an instrumental part in obtaining a workable licensing arrangement. The JCMPO's open door policy to the licensee allowed all concerned to expedite corrective action if the data transfer or qualification schedule slipped.

4. This royalty-fee license arrangement demonstrates that the strategy can be employed without royalty fees.

D. VERY HIGH SPEED INTEGRATED CIRCUIT PROGRAM

The Very High Speed Integrated Circuit (VHSIC) program was recently initiated to counter two critical situations [7]. First, DOD

learned that our superior lead in integrated circuit (IC) technology over the Soviets had significantly eroded. Secondly, the commercially oriented IC industry has become aloof to DOD's requests. Due to the fact that military business accounts for only seven or eight percent of total IC sales, the industry could not justify the major capital investment required to produce the circuits desired by DOD. The extremely high speed IC that DOD needed to ensure more accurate and sophisticated weaponry was not being developed by industry [7:3].

The VHSIC program was thus established by Congress as a tri-service program with the intent to stimulate the semiconductor industry to develop the specific technologies and the specific components which would allow the translation of this new technology into future programs. DOD hoped to achieve the technology that would allow miniaturization of electronic components to such a degree that a postage-size silicon chip could contain sufficient circuits to do the work of an IBM 360 computer. This technology would enable users to utilize the same chips, but through programming, to customize the chips to fit the desired application.

Through VHSIC, the Government will invest $200 million into nine major companies during the next five years to obtain the quantum leap in the IC industry [7:3]. With this large amount of money being poured into a very few number of firms, Congress became very concerned regarding how DOD would arrange for transferring the know-how gained from Government supported research programs to other companies in the semiconductor industry so that future military system contracts could be awarded in a competitive manner.

Interviews with personnel assigned to the VHSIC program pointed out that Congressional and DOD discussions led to the creation of mandatory clauses to be utilized in all VHSIC contracts (See Appendix J). These clauses provide the Government with the option of having licenses granted so that the technology developed under the program can be used in practice by DOD and its contractors as needed for future programs. This licensing option will allow the Government to transfer the valuable VHSIC technology to other companies without the Government buying a technical data package. The clause also holds the licensor responsible and liable for the transfer of VHSIC know-how to the licensee.

Another reason a licensing arrangement was settled on, as learned from the interviews, centered around the amount of company-owned intellectual property (IP) that would be commingled with the Government funded research. To avoid the issue of proprietary data and each of the VHSIC contractors claiming sole source to their developments, DOD decided to employ licensing options on all VHSIC contracts.

The VHSIC program, being very young, has experienced only one major problem in attempting to set up the licensing arrangements. Interviews with Navy personnel who were instrumental in the writing of the licensing clause conveyed to the researcher that finalizing the clauses required vast amounts of personnel resources. The option clauses had to be drafted in such a manner that they satisfied Congressional intent, were acceptable to the industry and they provided the Services with a workable arrangement. Prior to arriving at the final wording, DOD spent many man hours, wrote many revisions and a considerable amount of time was consumed.

The knowledge gained through research and interviews of DOD people familiar with the program enabled the researcher to envision some potential hurtles in the implementation of the VHSIC license option clause. These problems include:

1. Establishing the amount of the royalty fee to be paid to the licensor may well be a problem. Since the program centers around concepts and technologies rather than hardware, placing a value on the initial developer's proprietary data will be very objective in nature. The contractor and Government will have to agree upon a fee as a prerequisite to technology transfer.

2. Selection of the licensee will not occur until the Government requires the technology be provided to another program or contractor. Therefore, there exists the possibility that the licensor and licensee may not be compatible. In such a situation, the researcher believes a serious stumbling block to the licensing endeavor will exist.

3. Notwithstanding the two aforementioned problems, the highly complex, state-of-the-art technology and concepts involved in VHSIC possess the potential for very difficult technical and know-how transfers. The developer could conceivably be on a much higher level of knowledge and skill than the licensee. Attempting to teach the licensee tnis complex information may take time and could end up as an unsuccessful venture.

Although the researcher discussed the potential problems the program could encounter with DOD program personnel, the advantages to the licensing arrangement were also addressed. The advantages of the clauses to be included in all VHSIC contracts, as believed by the researcher, include:

1. The licensing arrangement nullified the need for the Government to purchase a reprocurement technical data package from the developers. Since the licensor is required to transfer the technology to the licensee and ensure the licensee can produce the item, the Government saves the money it would have otherwise spent on the reprocurement data package.

2. In this program, a licensing agreement was pursued because the Government had some IP with limited rights attached. The license thus allowed DOD access to this privately developed and owned data, without which another manufacturer could not utilize the advanced technology paid for by the Government.

3. The licensing clause will enable the Government to spread the technology base. By transferring the technology to the licensee, the Government not only gains a qualified source for the program concerned, but also develops a technically capable source for future programs.

Analyzing the VHSIC licensing arrangement, the researcher found some interesting points. This type of generic technology improvement has not been attempted in DOD to any great extent in the past. If the program becomes successful, the employment of future licensing strategies to spread the newly acquired knowledge to other DOD contractors seems logical. Additionally, the main reason a licensing strategy was employed in the VHSIC program centered around the existence of privately owned technical data. The Government decided the best and most equitable way for DOD to spread the new technology, realizing that the Government may have limited rights to some of the important IP, was through a licensing strategy.

E. HARRIER AIRCRAFT

Twenty years ago, the United States Marine Corps recognized the capabilities of a vertical and short takeoff and landing (VSTOL) aircraft as an ultimate requirement for all Marine aircraft in the future. The Marine Corps called this VSTOL capability vital to its aviation mission.

The flexibility and versatility of the VSTOL aircraft finally allowed the Marines to convince Congress to fund the program. During FY70, the Marine Corps acquired its first off-the-shelf VSTOL aircraft from a British manufacturer. This VSTOL aircraft was known as the AV-8A. Congress authorized DOD to procure the foreign-made plane in limited quantities and directed the Navy to begin measures to have the aircraft produced in the U.S. After negotiations, the Naval Air Systems Command (NAVAIR), the British Government and McDonnell Douglas Corporation (MDC) arranged for a license agreement between Britain's prime developer and McDonnell Douglas. This license permitted MDC to build the AV-8A, to modify the design as necessary to satisfy our Government's peculiarities, and to provide the U.S. firm with necessary technical assistance and know-how from the licensor. While MDC became familiar with the AV-8A and how to manufacture it, the Marine Corps began extensive tests on the British built aircraft. Working closely with the Marines, MDC proposed several modifications to the AV-8A to increase its performance, payload, and range. These modifications led to the newer design of the Harrier, the AV-8B. This aircraft's increased capabilities incorporated state-of-the-art technologies. Congress approved funding for two prototype AV-8B aircraft to be built by MDC.

Interviews with program office and associated contracting office personnel brought out some interesting aspects of the program concerning the original and improved model of the aircraft. Though McDonnell Douglas never built an AV-8A, the firm absorbed sufficient production know-how to produce the AV-8B prototypes. Since the vast majority of technology incorporated in the AV-8B was derived from the AV-8A, the license arrangement between MDC and British Aerospace (licensor) was still in effect.

The Navy had $108 million appropriated for full-scale development of the AV-8B in FY79, but the Under Secretary of Defense has refused to permit the Navy to obligate any of the funds on the Harrier program [9:24]. The rationale offered by the Secretary of Defense for the lack of funding for the program stems from limited funding for the entire Naval forces. By limiting the number of different aircraft programs, the Navy can buy larger quantities of the fewer types of aircraft due to reduction of unit costs brought on by economies of scale.

Through several interviews with program personnel, the researcher gained an appreciation for the problems associated with the AV-8A license. The significant problems seem to have been:

1. The technical data package (TPD) prepared by the British and provided to McDonnell Douglas differed significantly from the U.S. TPD format. In England, the company who develops the equipment retains all rights to the item, regardless of the amount of government funds involved. Therefore a TPD from England would necessarily contain extensive amounts of limited data. Attempting to transfer this information created problems. If MDC had a question about the data, they would

go to the licensor who would in turn direct McDonnell Douglas to the subcontractor who owned the data. As one can see, the U.S. licensee could not go directly to the licensor for assistance. The aspect of a single point of contact for the licensee was not present in this international license agreement.

2. The license arrangement that McDonnell Douglas signed up to contained very restrictive trade provisions. This stipulation reduces competition and could have an adverse effect on the price of the system.

The researcher also discussed the advantages of the license strategy with the same people. The key benefits of the strategy, as envisioned by the researcher, include:

1. The license agreement provided MDC a running start. They did not have to start from scratch in building a VSTOL aricraft. The designs and data provided to the U.S. manufacturer permitted the Government to save extensive R & D costs and developmental time.

2. The strategy set up a vehicle for cross-pollination of information and ideas. Technology transfer occurred in both directions between the two firms and nations. The necessity of close working relations in a successful licensing situation tends to encourage cooperation between England and the U.S. With two entities working together, the resultant aircraft, the AV-8B, turned out to be a better system than either company could have developed on their own.

3. Due to the nature of the strategy, a license requires much to be written down. In so doing, a tremendous amount of planning and managing must be accomplished prior to signing the final license agreement. This writing down of procedures and requirements tends to simplify the establishing of the second source.

Although McDonnell Douglas has not been allowed to enter the full-scale development phase on the AV-8B aircraft, some important points can be extracted from the case study. First, DOD, specifically the DOD prime contractor, MDC, gained the VSTOL technology and know-how without having to directly invest in an R & D program. Besides saving the Government this large expense, it allowed MDC to become a qualified manufacturer in a much shorter time period. Therefore the licensing arrangement gave the DOD prime contractor an important foundation on which to develop the U.S. version of the VSTOL. Without the data, designs, and know-how from British Aerospace, MDC might have had to expend a significant amount of time and money to gain the technology.

Secondly, the licensing strategy enabled DOD, by modifying an existing aircraft, to manufacture a better product. Through the cross flow of technology from one company to another, the Government achieved results that were greater than what could have been obtained from either firm alone. One interviewee summed up this occurrence by saying that the effort of two firms working together reaps better results than the sum of two firms working independently. This could have a very subtle implication. Since DOD desires to achieve the most advanced systems at the least cost, then this interviewee conjectured that perhaps two firms utilizing a licensing arrangement could possibly provide DOD with the best system at the fairest cost.

F. LANDING CRAFT, AIR CUSHION

The U.S. Navy recently embarked upon a concentrated effort to acquire an advanced craft, the Landing Craft, Air Cushion (LCAC),

which is based on tested principles [45]. The LCAC program will allow the Government to possess a high speed, over-the-beach, ship-to-shore amphibious assault capability to transport the equipment requirements for our Marine Amphibious Force. This program merges military requirements with the capabilities provided by new air cushion technology [45:1].

The landing craft, air cushion program structured its acquisition strategy to take full advantage of and logically build upon the tested and proven technology gained through the Navy's Advanced Development R & D efforts under the Amphibious Assault Landing Craft (AALC) program. This advanced R & D project provided DOD the avenue to thoroughly test and experiment with designs and hardware and did not concern itself with designing the product for end use. To achieve the goal of providing proven technology for later end use, DOD designed and built two craft: Jeff A and B. Although designed to the same performance and physical constraints, they represent significantly different solutions to the same technological problems. Because each craft had unique and innovative features, DOD decided to authorize parallel development of the Jeff A and B which culminated in the construction of two test craft [45:1-2].

Upon delivery to the Navy, the Jeff craft experienced extensive testing including a three week long operational demonstration which concluded with extremely positive results. The successful demonstrations and tests convinced DOD to initiate the LCAC program to allow the now proven technology to develop into usable end products. To accomplish this task, the Navy employed the technology developed and proven by the Jeff program by transferring it to the newly created air cushion

program. The transfer of this knowledge would hopefully assure the Navy a low-risk follow-on production craft [45:2-3].

The overall objectives of the LCAC program centered on the following factors [45:4]:

1. To reduce the technical risk of the program to a minimum and still satisfy the mission requirements.

2. The lead craft will be used to establish a minimum cost and schedule risk position for follow-on production units.

3. To obtain the earliest possible introduction of a true initial operating capability (six craft).

These objectives have led to a four-phased acquisition strategy; initiation, system design/specification competition, subsystem design and pilot production, and follow-on production [45:5].

Recently the Naval Sea Systems Command (NAVSEA) signed contracts with Bell Aerospace Textron and Rohr Marine, Inc. for the development of system design/specification for the LCAC [59:1]. This second phase of the strategy centers on design competition and also on continuing tests of the Jeff craft. The two contractors who received the phase two contracts are the same firms who built the Jeff A and B craft. Results from this competition will culminate in a recommendation to the Defense System Acquisition Review Council (DSARC) to select one contractor to initiate the pilot production of six craft. The final phase of the LCAC program, follow-on production, will call for the delivery of about seventy craft [45:5-6].

On the surface, this program appears not to possess any type of licensing strategy. However, interviews with program office personnel

and people in NAVSEA's contracting division indicate that licensing may be employed in the production phase of the program. The air cushion craft contain a considerable amount of patentable items and designs. To avoid future second sourcing problems, the recently awarded contracts included a clause which granted to the Government a nonexclusive royalty-free license to all patents involved in the contractor's vehicle which will expressly allow the Government [45:3-4]:

> To reproduce or to have reproduced articles or materials included in vehicles built under the LCAC program and to practice or cause to be practiced processes in the construction of such vehicles, and to use in their entirety and dispose of in accordance with law articles or materials so reproduced.

Since this program is still relatively young, no problems or benefits have actually materialized to date. The researcher interviewed several personnel attached to the program and offers the following comments:

1. Realizing the potential need for more than one producer in the production phase, NAVSEA wrote in the initial contract a clause which will allow the Government access and authority to use any and all patents involved in the system. In this program, patent rights, vice limited data rights, were seen as the potential stumbling block for second sourcing. DOD has correctly ensured that their options for the future remain open by planning early in the program for a licensing arrangement.

2. A firm decision now to second source seemed to be premature. The decision to second source will only be made in the affirmative if sufficient quantities and funding allow for positive economic considerations.

3. A tight time constraint existed to develop and produce an air cushion vehicle. By utilizing existing patents, the prime design contractors were able to build the Jeff craft within a relatively short

timeframe. If production requirements are as great as the planned quantities, a qualified second source may be required rather quickly. The licensing of patents would hopefully allow NAVSEA to obtain a second source in a timely fashion.

G. MARK 75 GUN MOUNT

In the early 1970's, the Chief of Naval Operations (CNO) requested that an in-depth review of foreign made weapon systems be conducted with the hopeful result of finding systems that would have near term application for the U.S. [50:5]. A Foreign Ordnance Review Team, a fall out of the CNO's request, completed the in-depth review and furnished the top Naval Official their recommendations. As a result, the Chief of Naval Operations selected the Italian built Oto Melara gun mounts (MK 75) for installation on the Patrol Hydrofoil Guided Missile (PHM) class of ship [50:5].

At that time there was no gun mount of U.S. manufacture comparable to the Oto Melara's 76mm/62 caliber compact gun system. The closest alternative the U.S. had, the 3"/50 caliber gun mount, was lacking in the rate of fire, weight considerations, proven reliability, and required too much man-power to operate it. The Navy felt it needed the Mark 75 Mod O gun system to update its minor caliber capability. The PHM class of ship dictated a requirement for a rapid fire, light weight, and fully automatic gun. An additional constraint placed on the Navy was time. The new class of patrol ship would soon be operational and thus the time frame available to design, develop, and test a new U.S. produced gun was insufficient [50:5].

To meet the Government furnished equipment delivery schedule of the MK 75 Mod O gun to the shipbuilders, the Naval Ordnance Systems Command (now Naval Sea Systems Command) originally contracted with the prime item developer, Oto Melara, to deliver gun mounts for the first two ships of the class and the Navy stated in its acquisition plan that it would develop a U.S. manufacturing capability through a license arrangement with the Italian developer [50:5-6].

A selection process was conducted to determine the U.S. licensee of Oto Melara's gun which culminated in the writing of two licensing arrangements; one with the Government and one with FMC, Northern Ordnance Division (NOD). One interesting aspect of the Government's agreement was that it contained a guarantee to the U.S. Government. Specifically the license stated [29:J-18]:

> The Contractor hereby agrees to indemnify the Government of the U.S., its officers, agents, and employees against liability, including costs, for any claims by the U.S. licensee of the Contractor arising out of or related to:
>
> (a) inaccuracies in the technical content of the translation of the Contractor's data package; and
>
> (b) inadequacies, incompleteness, inaccuracies in the technical data, or ambiguities in the Contractor's data package, including, without limitation, (i) internal conflicts within the data package, (ii) inability of mounts made in accordance with the data package, (including any tangible or intangible know-how), to meet the requirements of OTO's performance specification and (iii) inability of (repair) parts of each mount manufactured in accordance with the data package to be interchangeable with the corresponding parts of all other mounts so manufactured.

Interviews with program, contracting, and legal personnel at NAVSEA raised some interesting problems that the eight year old license arrangement has created. These problems include:

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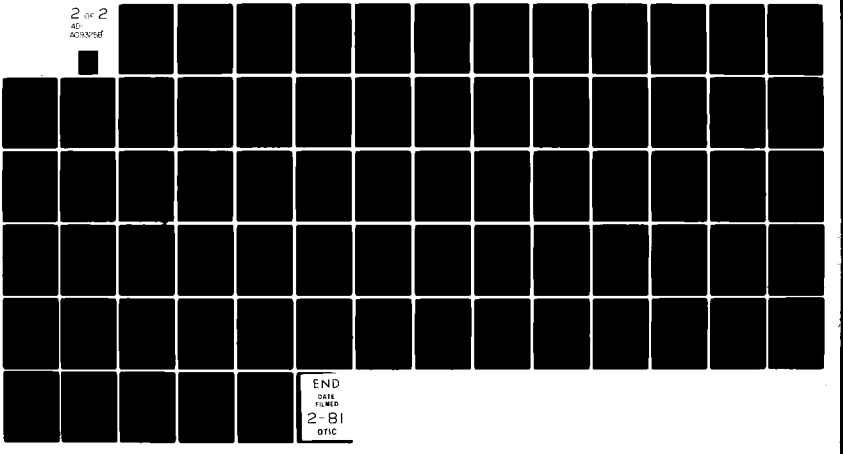

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1. The price of Northern Ordnance's gun mount exceeds that of Oto Melara's by a million dollars each. This situation materialized for several reasons: (1) the royalty fee had to be added to the licensee's price, (2) the developer has procured a vase quantity of mounts and thus enjoys a considerable price advantageous on the learning curve, (3) Oto Melara's pays its employees a substantially lower labor rate, (4) Northern Ordnance takes pride in its quality reputation, a costly endeavor, and (5) the U.S. manufacturer historically has very high overhead burdens. The Naval Sea Systems Command last year had to justify to DOD why the U.S. should buy Northern Ordnance's gun with a price tag in excess of the foreign source's price. NAVSEA justified the additional expenditure by stating [70:2]:

> The degradation of the mobilization base for ordnance production which would result from a procurement of the FY 79 MK 75 gun mounts direct from Oto Melara vice NOD far outweighs the relatively minimal cost savings which could be realized.

2. The technical data package (TPD) provided to Northern Ordnance was seriously lacking. This occurred for a number of reasons. First, the original TPD had to be translated into English and much was lost in the translation. Secondly, the Italian's manufacturing processes differed from the U.S. industries'. Thirdly, a significant amount of manufacturing know-how and processes are not normally written down in Italian firms. This stems from the fact that an employee in an Italian firm tends to be employed for life and typically does the same job during his tenure. If the company or individual discovers a better way of doing something, it will be verbally approved and passed to the worker, but never written down in any type of documentation.

3. Northern Ordnance is the sole major ordnance producer in the U.S. When Northern Ordnance had a problem with the TPD and a manufacturing process, it did not want to ask the foreign licensor how he did it. Instead the licensee found a way to successfully complete the task. In one case, the drawings provided to them required a seam of a metal part to be continuously welded. Each time the licensee welded the seam, the part experienced a great deal of warpage. Northern Ordnance, refusing to say they needed help, attempted to restraighten each part. It was later discovered that Oto spot welded the seam.

4. Oto Melara guaranteed the TPD to be accurate. The Government believed that the guarantee included technical know-how. The developer's interpretation of the clause claimed he was responsible for what was contained in the data package but not for know-how which could change the written information. Currently, the Government is attempting to determine Oto Melara's legal responsibilities.

Although the MK 75 Mod O system has experienced significant problems, some advantages to the license strategy have been achieved. These, gained through personal interviews, include:

1. The license strategy allowed the U.S. to obtain and utilize foreign technology. Through the transfer of technical data and assistance, the U.S. manufacturer gained state-of-the-art technology.

2. Direct licensing enabled the Government to obtain a second source for the weapon system in a relatively short period of time.

3. The Government saved itself R & D costs by employing the proven design and technical data developed by Oto Melara.

In analyzing the MK 75 gun mount licensing strategy, the researcher believes the following points to be important:

1. The foreign produced TPD was not complete enough to stand alone. Different standards, processes, and the lack of documentation posed significant problems to the licensee.

2. The key factor that initiated the licensing arrangement involved the desirability of establishing a second source of supply in the U.S. The Government wanted to ensure, for mobilization reasons, that the gun was being produced by a U.S. firm.

3. A tight time constraint between the selection of the system and the requirement to second source added to the need to direct license.

4. Although the cost of the licensee's gun was considerably higher than that of the licensor's, the Government still purchased guns from Northern Ordnance, stating mobilization base considerations as the driving force.

5. The Government believed the license arrangement held the licensor liable for assisting the licensee to become qualified. As it turned out, the licensee did not desire to ask for assistance and the licensor did not feel contractually obligated to continually check up on the licensee. To get an active participant as a licensor, the Government needs to write the agreement in such a way that the licensor is contractually required to assist and is responsible to qualify the licensee by a certain time.

H. SUMMARY

This Chapter presented six case studies that involved licensing strategies. Each case offered some unique aspects about the strategy. The implications these points present to DOD licensing policy and the direct licensing decision-making process will be elaborated upon in Chapter VI.

VI. ANALYSIS OF THE LICENSING PROCESS

A. GENERAL

This Chapter will analyze the decision-making process regarding whether a program should utilize a direct licensing acquisition strategy. The major objectives of a specific program will first be reviewed in light of a licensing strategy. The fundamental factor of who owns the data and rights and how it affects the licensing decision will be addressed. The possibility of expanding the Defense Acquisition Regulations (DAR) to include a new type of data rights will also be discussed. The Chapter will then look into situations where the Government owns all the rights but may still desire to utilize a license strategy. The Chapter will conclude with a discussion of the importance of reviewing the availability of management resources prior to embarking on a licensing endeavor.

B. ASSURANCE OF SUPPLY VERSUS OTHER OBJECTIVES

The desire to second source can stem from many objectives or goals inherent in a program. The two reasons for second sourcing most often discussed with this researcher were cost reduction and the assurance of supply. Effective price competition is universally sought after by all program managers (PM). A lower end-price of an item allows the PM to save money on each unit and in turn provides the manager more dollars to spend on other needed items to support or modify the system. Unless the Government can negotiate a royalty-free license with the licensor, a direct licensing strategy typically will not be practiced in a program

where cost competition is the primary goal. As discussed in Chapter V of this thesis, JCMPO utilized direct licensing for the guidance subsystem to obtain their main objective of cost reduction through competition. The reader will recall that the licensing arrangement settled on was a royalty-free license.

The reason a royalty license does not usually result in a price reduction stems directly from the value of the royalty. Several people expressed the opinion to the researcher that the licensor may demand a royalty fee either so high that the licensee could never effectively price compete with the licensor, or the fee could be set at an amount that enables the licensor to continue to price his item at an inflated price. In the latter case, the licensee's price before the royalty fee is included may be significantly lower than the licensor, but the addition of the royalty fee eliminates this price differential. Therefore, if price competition becomes a primary goal of a PM, the amount of the royalty might easily prevent a direct licensing strategy from being employed.

If, on the other hand, the assurance of supply becomes primary to the PM, direct licensing may serve the program extremely well. In Chapter IV, the researcher presented and enumerated on the Thompson-Rubenstein Leader/Follower Model which included a discussion on availability of supply. The three main reasons why a PM may have availability as his primary objective were presented in Chapter IV and found to be:

1. Mobilization base.
2. The present producer lacks sufficient capacity or capability.
3. Producer's ability or willingness to produce in the future is in doubt.

Licensing aids a PM in developing a second source to ensure there is a sound production or mobilization base. If availability dominates as the primary objective, as it did in the MK 75 Mod 0 gun case, then cost reduction usually takes on a secondary role. Although cost was important in the Northern Ordnance case, the Government decided that mobilization considerations justified the additional cost of buying from the licensee. This occurrence supports the researcher's belief that even though a royalty fee may make the licensee's price higher than the licensor's, a PM may want to purchase units from the second source. This may happen either out of necessity, if the licensor does not possess the capability, or out of desirability to maintain a readily available production base. Drawing on the above example, the researcher observes that a direct licensing strategy is one tool available to a PM that will help to assure availability of supply.

C. LIMITED INTELLECTUAL PROPERTY

The vast majority of the interviewees felt that the most critical factor regarding the feasibility or desirability of a direct licensing acquisition strategy centers around the question of who owns the intellectual property (IP). If the prime developer claims he owns some of the rights to patents, data, or know-how or claims trade secrets are involved in the manufacturing process, and these facts are required to produce the item, those interviewed recommended that a licensing strategy should be seriously evaluated. As has been demonstrated in all the programs presented in Chapter V, a license allows the Government and the licensee access to this essential information.

A major problem faced by DOD is determining the legal ownership of IP. Resolving the question of legal ownership requires much time and research. A contractor, as seen in Chapter V with the Cruise Missile engine, can claim ownership to almost all the IP. In this case the Government learned, through a drawn-out process, that the contractor did not possess the rights to as much of the IP as he had claimed. The Government is now contractually bound to pay the contractor a royalty which was not truly due him.

One individual suggested that if a contractor provides the Government data with limited rights attached and there is insufficient time to legally determine who actually owns the IP, then an agreement to tie the value of the royalty to the amount of IP finally determined to belong to the contractor whould be written into the license. By doing this the Government would only have to pay a royalty for the IP the contractor legally owns.

D. MANUFACTURING RIGHTS

The problems associated with limited IP is exacerbated by the fact that the DAR only addresses two types of rights in data namely limited rights and unlimited rights. This lack of flexibility was the point of discussion with many of the interviewees. In the Government's attempt to gain rights to use data for competitive acquisition of an item, DOD might have difficulties with a contractor claiming extensive limited rights in the data. If the contractor believes he has rights to some data and desires the data be given to the Government with some type of limitation attached, the contractor is forced to provide the Government with

limited rights to the data. In a recent letter to the Director of the Defense Acquisition Regulatory Council, the Chairman of DAR's Technical Data Working Group recommended a review of DAR's rights in technical data coverage be initiated [67]. Stating that all the services felt they needed more flexibility in the types of rights available to the Government, the letter recommended that a new type of rights be evaluated, specifically; Manufacturing Rights. These rights would be similar to limited rights, except that they would include a provision to allow the Government the additional rights to use the data, duplicate it, and disclose it to others for the specific purpose of manufacturing for the U.S. Government only. Other firms who would have access to this type of data would also be required to abide by the same condition as applicable to the Government [67:2].

The creation of this new type of rights would inform the developer of the exact extent to which the Government could employ the information. Unlike unlimited rights, manufacturing data rights would require the Government and the second source to closely guard the associated data. If the contractor was concerned about dissemination of his proprietary data, these new rights may provide sufficient protection for his rights and thus he may not attach the limited title to them.

The idea of the inadequacy of the limited and unlimited rights was also addressed by the Commission on Government Procurement [35:pt.8(1)]. In the Commission's recommendation on inventions and innovations, they addressed the topic by stating that the requirement for, and the quantum of data to be furnished to the Government should be determined by a "need to know". In other words, the Commission

felt the Government should acquire the data only for a specific purpose. The creation of manufacturing rights would help fulfill the Commission's recommendation. Table 2 depicts the inclusion of this type of rights into the IP structure.

E. COMPLEXITY OF THE SYSTEM

There may be situations where the prime developer does not claim rights to any of the IP, yet it would be advantageous for the Government to utilize a licensing strategy. The first instance discussed with the researcher during the interviews where a license may be appropriate even when the Government owns all the IP would be in a situation with a very complex system. Due to the complexity of the item, a complete technical data package may quite likely lack sufficient detail or description to allow another source to produce the item without some type of assistance from the developer. This would also be true for complex manufacturing processes. Most all the interviewees agreed that a license arrangement would provide that necessary liaison.

One contracting person offered another situation where the Government may desire to employ a licensing technique; namely, when complex design philosophies are incorporated into a system. In such a situation, it could be advantageous for the Government to have the developer retain design responsibility for the product throughout the life of the item since the developer may be in the best position to determine how changes or modifications will affect the system in total. Anyone other than the developer may very well lack the in-depth knowledge to thoroughly evaluate all the consequences of these changes on the system and its associated functions.

TABLE 2

INTELLECTUAL PROPERTY

INCLUDING MANUFACTURING RIGHTS

TIME FRAME:	EARLY		LATE		
RIGHTS:	LIMITED	UNLIMITED	LIMITED	MANUFAC-TURING	UNLIMITED
TYPE OF IP:					
KNOW-HOW	N/C*	N/C*	N/C*	?***	N/C*
DATA	N/C*	N/C*	DAR**	?***	DAR**
PATENT	N/C*	N/C*	DAR**	?***	DAR**

SOURCE:
DEVELOPED BY RESEARCHER

NOTES: N/C*= NOT COVERED IN DAR
DAR**= COVERED IN DAR
?***= POSSIBLE FUTURE DAR COVERAGE

F. POTENTIAL FOREIGN MILITARY SALES

Another application that licensing has in the DOD acquisition arena is in the area of Foreign Military Sales (FMS). NATO countries desire weapons which support the Rationalization, Standardization and Interoperability (RSI) concept. Basically, the NATO countries strive for RSI to ensure their weapons use as many common parts and systems as possible, that the systems are compatible with each other, and that if a country has a proven weapon system that NATO could employ, the countries should buy that system to save R & D costs and developmental time [49].

The fallout of the NATO RSI philosophy on DOD programs has been an increased purchasing of systems by foreign countries. Additionally, the NATO countries are not satisfied to just purchase these systems from the U.S. manufacturers. These foreign countries desire to manufacture our weapons overseas. A licensing arrangement allows the U.S. developer to expand his market abroad and, at the same time, to reap royalties for granting a foreign firm the rights to produce the system [49].

NATO guidelines specifically address the concept of anticipating the need for weapon system technology transfer to other countries in the Organization. The guidelines state that, "In contracts with U.S. firms, (the Government will) assure ability to transfer technology and know-how to NATO cooperative programs on appropriate terms." [49:2-2]. The guidelines continue in the same vein by saying that the Government should attempt to either: (1) gain unlimited rights in all the relevant IP, or (2) find a way to require the transfer of the developer's IP under a reasonably priced license arrangement [49:2-3].

The researcher, therefore, believes that a PM should evaluate whether his program has FMS or NATO potential. If it does, the PM should arrange for a vehicle to allow for the possibility of establishing a foreign source. Licensing arrangements have been utilized to a great extent in the past to accomplish this task.

G. MANAGEMENT CONSIDERATIONS

As was seen in all the cases presented in Chapter V, establishing and administering a license arrangement requires a considerable amount of managerial skills and resources. This is true for the Government and the potential licensor alike. As seen in the VHSIC program, many Government legal skills were required to draft and review the license arrangement. In addition, patent lawyers may be called upon to review the contract or claimed limited IP to determine true ownership of the IP.

A license agreement, by the nature of its requirement to have the licensor assist the licensee, will demand the licensor to have significant personnel resources. As was the case with Williams, the licensor lacked significant managerial resources to provide the licensee with the assistance and know-how that was required. The lack of resources available to the licensor, the researcher believes, also contributed to the problems of the licensing strategy.

The researcher feels that if the program manager lacks the depth of personnel resources to implement and administer a license arrangement, or if he feels the developer lacks the personnel to ensure a successful license strategy will occur, then he may want to pursue another acquisition strategy.

H. SUMMARY

Domestic licensing has seen limited application in DOD weapon system programs. This stems from the fact that although price competition can be achieved through a licensing arrangement, a licensing strategy tends to be employed when availability concerns are paramount. The desire to establish or increase a production or mobilization base is only pertinent to a few selective programs.

In DOD programs where the Government acquires unlimited rights to all the data, the need for a license is drastically reduced. If assistance is required from the developer when the Government owns the IP, then typically a leader/follower strategy would be employed with perhaps an integral royalty-free license built in.

The impact potential FMS has on the decision process was then presented in the Chapter. The importance of managerial resources both from a Government and contractor's point of view rounded out the Chapter.

The next Chapter will provide a direct licensing decision model which will essentially bring together all the important factors presented in this thesis in a single flow chart. The decision points on this model will also be briefly discussed.

VII. DIRECT LICENSING DECISION MODEL

A. GENERAL

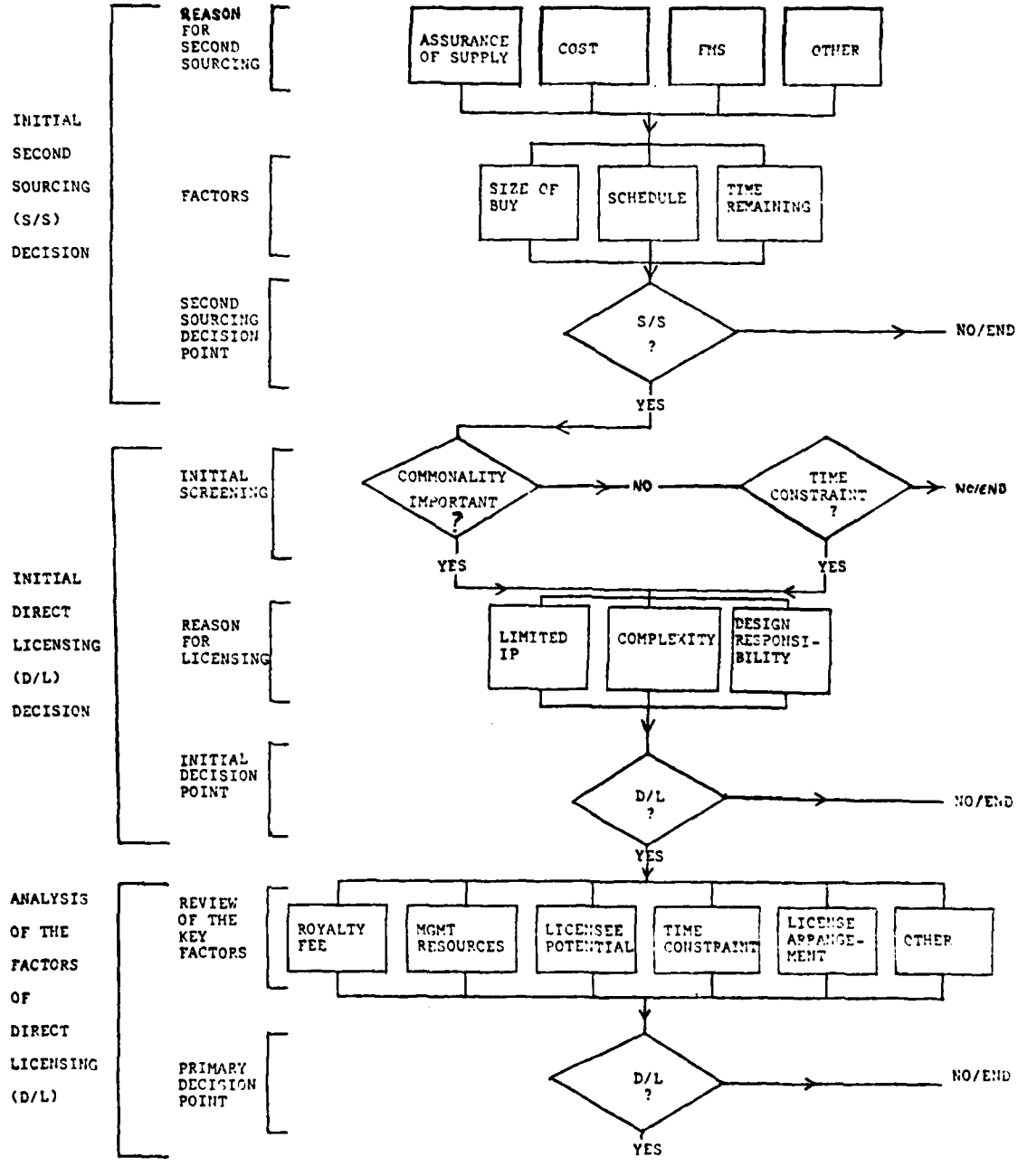
Based on all the foregoing, the researcher is now in the position to present a model and briefly describe the characteristics of the factors that are incorporated in the model. Table 3 depicts the Direct Licensing Decision Model (DLDM). The model is not intended to be a hard and firm decision tool, but rather one that consolidates key factors and variables into a manageable model to augment the decision process. The model is general in nature, and thus when applying the model to a specific program, the decision maker is cautioned to take into consideration the unique characteristics and parameters of the program. A properly developed strategy will be tailored to coherently meld with the overall program objectives and special considerations of the particular system.

B. THE SECOND SOURCING DECISION

The researcher has found through his interviews that inherent in a DOD decision to license is the foregone conclusion to second source. The preliminary decision to second source should be made before one considers whether a licensing strategy should be employed. The major reason a PM desires to look for another source is the foundation of this decision. The first major step in the DLDM is the second sourcing decision. Consisting of three substeps, the second sourcing decision's first substep concerns itself with the purpose for dual sourcing. The reader will recall from Chapter IV, the four main reasons for second sourcing include:

TABLE 3

THE DIRECT LICENSING DECISION MODEL



SOURCE: DEVELOPED BY RESEARCHER

1. ASSURANCE OF SUPPLY - The interviewees agreed that program managers desire the reassurance that the system sought can be delivered in the quanities required in accordance with the planned schedule. Chapter VI discussed this point in depth.

2. COST - Reviewing acquisition literature, it became apparent that PM's are worried about the affordability of their system. Affordability balances the cost of the system against the requirement and the available budget dollars. The price tag of the weapon system must be low enough to allow the Service concerned to procure significant quantities to fulfill the requirement and yet remain within the monetary constraints. Competition is one proven avenue that a PM may pursue if he is concerned that his system's cost either is or may become excessively high. As discussed in Chapter II, the cost to establish a second source must be evaluated in light of the potential benefits of such an endeavor. Only if the competition will allow the Government to reduce its costs by more than what it costs to establish a dual source would a PM attempt to set up a second source if cost was a major concern to the program.

3. FOREIGN MILITARY SALES - Foreign Military Sales (FMS) interface with the two previously discussed reasons to establish a dual source. The increased quantities generated by FMS could contribute to a downward trend in unit cost and also place added requirements on the producer. Another facet to these sales, as discussed in Chapter VI, involves the desire by a foreign country to develop the capability to produce the system on their home soil. NATO agreements state that countries of the Organization will plan for the possible requirement

of establishing and qualifying a foreign source to produce certain weapon systems.

4. OTHER - A program may be susceptible to other environmental pressures that generate a need to create another producer. This situation must be weighed in light of its unique goals.

A PM may be faced with any of a number of these reasons to second source. The manager should be able to prioritize these goals, keeping in mind their importance as the model is reviewed.

After reveiwing and prioritizing the reasons for second sourcing, the decision maker moves down to the next step in the DLDM which involves the review of factors particular to the project to see how compatible they are with a dual sourcing endeavor. The following important factors should be weighed and evaluated against the particular reasons for the effort:

1. SIZE OF THE BUY - As discussed in the Parry-Sellers model in Chapter IV, the size of the buy must support the rationale for establishing a second source. If the buy only amounts to one or two units with no envisioned future buys, a dual production capability might not be appropriate. Typically, the higher the quantity, the more advantageous a second sourcing endeavor becomes.

2. SCHEDULE - This factor was presented in the second sourcing model contained in Chapter IV. The delivery schedule, reliant upon the quantities desired, will also greatly influence the feasibility to second source. If the delivery schedule is stretched out over several years, with few quantities to be delivered each year, establishing a second source will be a costly endeavor. The larger the quantities

and the closer the deliveries are to one another, the more cost effective dual sourcing becomes.

3. TIME REMAINING - The reader will recall that the importance of time was addressed in the leader/follower model in Chapter IV. As previously discussed, creating a second source requires time. Although this time varies considerably between second sourcing methodologies, it takes a considerable time to obtain a qualified second producer. The time remaining on the project must be evaluated against the time required to get the second producer on line. If the program is short lived, a second sourcing effort most likely would not be a good strategy.

Weighing the reasons why it may be desirable for a program to be second sourced against the factors presented above, an initial second source decision can be made. If this decision is made in the affirmative, a PM, with the advice of the PCO, may then decide to attempt to evaluate a license arrangement.

C. THE INITIAL DIRECT LICENSE DECISION

1. COMMONALITY - In attempting to second source, a program manager must, at this point in time, select a specific method or strategy to accomplish the task. In evaluating if licensing should be tried, the question of commonality must be addressed. If the PM feels it advantageous to acquire identical systems, for whatever the reason, a licensing strategy can be considered. Since licensing tends to produce very similar end items, and this was not required, by pursuing licensing, the Government would be paying a considerable amount of money for the non-relevant convenience of commonality.

2. TIME CONSTRAINT - If a program has a tight time constraint to qualify another source, and it is envisioned that it will take considerable time to develop a second source through any other method, then licensing may still be an advantageous strategy to DOD and may deserve further evaluation. Typically, DOD utilizes the form, fit, and function method if commonality is not important. However, as pointed out in the Parry-Sellers model, this method requires extensive time to qualify an additional source.

Once this initial evaluation has been accomplished, the decision maker moves to the next substep in the decision model. This step asks the question: Why should direct licensing be pursued? There are three reasons which this researcher found make a licensing strategy attractive:

3. LIMITED INTELLECTUAL PROPERTY - The primary reason brought out in most interviews for the Government to embark on a licensing agreement concerns who owns the intellectual property (IP). If the Government owns clear title to all the IP in the system, DOD would not pursue a licensing endeavor for this particular reason. Other reasons to license, however, may apply. Typically, the developer will claim rights to some important IP, without which a reprocurement effort for this item would be next to impossible. In this scenario, the Government has a very good reason to utilize a direct license strategy as was demonstrated in the cases. It should be noted that the prime developer could believe he owns some IP which may turn out to belong to the Government after a thorough legal review is performed. The Williams Research program is a case in point. The contractor conceivably

could claim title to IP to attempt to drive the Government into paying a substantial royalty.

4. COMPLEXITY - A second reason the Government may find it attractive to consider a licensing strategy would be due to the complexity of the item or its associated production process. The information furnished by the technical data package (TPD) may be insufficient to allow the second source to produce the item. A licensing agreement allows the Government to have the developer provide the valuable technical assistance and know-how to the second source. If a foreign firm were to become the second source to produce the item, then it is possible the U.S. manufacturing processes and TPD will require much interpretation and a strong likelihood that the foreign company would need technical assistance from the developer in order to become qualified. The reader is referred to a recent LMI study for an in-depth discussion on this point [49].

5. DESIGN RESPONSIBILITY - If the Government feels it would be advantageous for the prime developer to retain design responsibility for the life of the program, then a licensing arrangement may be desirable. As discussed in Chapter VI, the Government may embark upon this strategy because the design philosophies are only retained and known by the developer. Processing defective hardware and evaluating changes may well be best handled by the firm who initially developed the item.

A program manager may find one or more of the reasons to license applicable to his program. If that is the case, the next logical step in the DLDM, analysis of the factors, should be undertaken. If the PM discovers that there are no compelling reasons to license, then a direct licensing strategy should not be considered.

D. ANALYSIS OF THE FACTORS

Once a reason has been established to license, several factors must be evaluated and analyzed to determine if a license arrangement is the strategy to pursue. A brief description of the six key factors that require in-depth evaluation:

1. ROYALTY FEE - The amount of the royalty fee will determine to a great extent if the development of a licensee will be cost effective. If a program's top priority turns out to be cost, attempts should be made to negotiate a royalty-free license. The amount of royalty fee the developer desires will be related to the amount of privately owned data and its importance. As discussed in Chapters IV and V, since resolving the legal question of who owns the IP can become a lengthy process and the Government would rather not pay a royalty for Government owned information, the agency should attempt to link the royalty fee to the amount of contractor legally owned IP. Although settling on how this mechanism would tie the fee to the amount of reduction in the contractor owned IP remains to be worked out, it would be to the Government's best interest to strive for such an arrangement. If the price asked for the royalty is prohibitive, the PM may decide to pursue an acquisition strategy other than licensing.

2. MANAGEMENT RESOURCES - As discussed in Chapters V and VI, a licensing strategy requires vast management talents and skills for extended periods to successfully write, review, negotiate, monitor and implement a licensing arrangement. These resources must be available to the program office as well as to the licensor. If an analysis indicates that the licensor does not possess the personnel to provide

the extensive assistance and expertise to the licensee throughout the qualification stage, the PM may be wise to select another acquisition strategy. The same re-evaluation may be required if the Government cannot provide the PM with the needed resources.

3. LICENSEE - The program office must also be concerned about the second source. The selection process of the licensee may be difficult. Can a licensee be selected who will be satisfactory to both parties? How well will the licensor and licensee work together? Does the licensee possess the potential to produce the product? These points were discussed in Chapter IV. Questions like these must be considered and the answers evaluated prior to deciding if a licensing agreement should be arranged. The capability of the licensee is a vital link in any licensing strategy.

4. TIME CONSTRAINTS - A licensing strategy, if properly planned for and implemented, reduces the time necessary to qualify a second source. This factor was brought out in the cases. If a PM finds himself with limited time to obtain another source, licensing may be a good strategy to utilize. If, on the other hand, time is not a concern, there may be another strategy that will serve to acquire a dual source in a better manner.

5. LICENSE ARRANGEMENT- The vehicle which creates a direct license arrangement, the license itself, states the legal framework and requirements of the parties involved. Basic to a DOD licensing decision is the ability of the Government to negotiate a license which will be satisfactory to the Government, the licensor, and the licensee. Such important points as the following must be agreed to: (1) firmly established

milestones for the technology transfer which hold the licensor responsible for the licensee's qualification by a certain date, (2) royalty fee amount (3) providing Government sufficient leverage to enforce the license, and (4) allowing the Government the ability to satisfactorily monitor the licensee's progress and evaluate their problems. Chapters V and VI discussed these points and ways to ensure the Government's rights. If the PM feels that the Government may not be able to settle on a satisfactory license agreement, then another strategy should be seriously considered.

6. OTHER - This category accounts for other pressures of factors present in a program. One such factor would be the suitability of other second sourcing methods. If no other strategy provides a better plan of attack, then licensing quite possibly is the most beneficial strategy. Also, other factors to consider may include outside direction given to a PM. These facts could outweigh all the other factors considered herein.

With the results of the detailed analysis of the factors completed, the PM is in the position to weigh the results in light of the reasons for pursuing a second source, and for a licensing strategy. The decision maker then can make a logical decision whether a direct license strategy would enable the program to attain the goals and objectives of the program, consistent with its unique characteristics.

E. SUMMARY

This Chapter presented the Direct Licensing Decision Model (DLDM) as developed by the researcher. Table 3 depicted the model in a flow chart. The model divided the process into three phases: the initial

second sourcing decision, the initial direct licensing decision, and the detailed analysis of the factors. The DLDM incorporated many factors and decisions into a logical and simple model. In applying this general DLDM to a specific system, the decision maker should ensure that the unique and special demands of the program take priority. That is to say, the model should be tailored to the program.

This model should only be used as an aid to the PM in the second sourcing decision process and should not be substituted for the actual decision-making mechanism.

VIII. CONCLUSIONS AND RECOMMENDATIONS

The researcher, drawing on the literature, personnel interviews, and independent analysis, culminates this thesis with several conclusions and recommendations. Although the reader may not agree with all of the thoughts expressed herein, the researcher believes that they express general opinions that are representative of the acquisition community.

A. CONCLUSIONS

1. The Government must ensure it obtains sufficient leverage over the licensor if a successful licensing strategy is to materialize.

The Joint Cruise Missile Project employed two licensing arrangements which ended up on opposite ends of this spectrum. In the Williams case, the Government failed to gain the proper leverage over the licensor. As a result, the strategy has been plagued with problems. On the other hand, JCMPO had sufficient clout over Litton to precipitate a successful strategy.

Being a second sourcing methodology, direct licensing will most likely be employed in future DOD programs. A PM who decides to include a licensing arrangement in his program must ensure that this strategy will be a successful one. Obtaining proper Government leverage over the licensor will greatly assist in this effort.

2. Direct licensing is predominately selected as a second sourcing acquisition strategy when the Government lacks sufficient rights in the intellectual property to reprocure through a technical data package.

In every case presented in Chapter V, limited rights to the IP was the key factor that drove the Government's decision to license.

When a program manager creates his acquisition plan, and if he acknowledges the desire to second source, he must evaluate how the dual source will be cultivated. If it is envisioned that the Government will have limited rights to the data, the licensing option should be thoroughly evaluated.

3. Resolving legal ownership to intellectual property is a very time consuming process and can present a stumbling block to a second sourcing endeavor.

If a contractor claims rights to IP, without which the Government realizes it would be difficult to qualify a second source, the agency's dual source effort may be in jeopardy. DOD could decide to redesign the item to circumvent the proprietary data issue, but that typically takes a considerable amount of time and the new item would not be identical to the original item. The program manager may attempt to negotiate a license agreement with the developer, but the PM will be faced with the problem of determining who owns the rights to the IP. The PM does not want to pay a royalty fee for IP which may rightly belong to the Government, but as was seen in the Williams case, the legal review process for IP is quite lengthy. Typically, the Government finds itself in this less than desirable position.

4. A sole source prime developer must be motivated to participate in a direct licensing effort.

A developer who enjoys a sole source position must be shown why he should assist another company to become a direct competitor. By

establishing a licensee, the developer loses the business which the licensee obtains.

In both Cruise Missile cases presented, the developer had to be threatened with open competition before he would agree to a licensing arrangement. The contractor saw the license as less of a threat to him than open competition. This is because he was guaranteed a royalty fee for the business he lost to the licensee and was guaranteed a certain percentage of the business.

If a PM decides that a direct license strategy is the most beneficial one to pursue, he is faced with the challenge to properly motivate the developer into agreeing to the strategy.

5. The direct license decision process is a complex evolution which involves a myriad of factors, analysis and decision points.

As was shown through the cases and in the models presented, a second sourcing licensing decision requires an in-depth review of many variables. The personnel who perform this review and provide inputs to the decision maker must consider all these factors if a proper direct license decision is to be made.

6. Department of Defense tends to utilize licensing to increase production capacity or to expand the mobilization base.

The interviewees and several of the cases in Chapter V provide a basis for this point. Many people feel that the licensing process cannot provide effective competition. A program with goals involving production or surge considerations may be a good candidate for a licensing arrangement.

B. RECOMMENDATIONS

1. The Direct Licensing Decision Model should be utilized to assist decision makers in evaluating the potential for a licensing strategy.

The DLDM as presented in Chapter VII will assist the PCO and the PM in their licensing decision process. This Model should be made available to DOD agencies in order to provide a logical and organized framework to be followed in the decision process.

2. The Government should ensure the license arrangement provides for an open door, two-way communication link between the licensee and the Government.

This avenue of communication, as was seen in the case of the guidance subsystem for the Cruise Missile, allows the licensee to express his concerns and problems directly to the Government. This additional communications channel would enable the Government to discuss potential problems with both parties before a problem got completely out of hand. Establishing such a system would provide visibility into avoiding major problems from occurring.

3. If time constraints prevent a complete legal review of ownership of intellectual property rights prior to signing of the license, the royalty fee should be linked to the final amount of contractor owned intellectual property.

This point was discussed in the Williams case. As the reader will recall, the engine developer originally claimed rights to a large portion of the IP, which was subsequently reduced to just a few items. However, the Government was required to pay the originally agreed to royalty fee regardless of how much IP the contractor legally owned.

This clause would allow DOD agencies to pursue a license agreement without necessarily knowing how much contractor owned IP was involved. By reducing the royalty fee if the quantity of contractor owned IP is reduced, the Government avoids paying undeserved royalties to the developer.

4. The license agreement should make the licensor responsible for the successful qualification of the licensee, and if the licensee fails to be qualified by an agreed to date, the licensor should be required to provide the Government, at a reduced cost, the units scheduled to be delivered by the licensee.

This clause should provide the Government sufficient leverage over the licensor to ensure a successful licensing strategy.

C. ANSWERS TO THE RESEARCH QUESTIONS

1. To what extent can licensing be an advantageous strategy?

Direct licensing provides an avenue to DOD to obtain a second source in a relatively short time frame. Additionally, licensing allows the Government and the second source access to otherwise non-available proprietary data and know-how for the purpose of creating a dual source capability. A licensing strategy provides the licensee with technical assistance and know-how that would be extremely helpful in second sourcing a complex system.

2. What is licensing and what problems and issues permeate this acquisition strategy?

Direct licensing is an acquisition strategy utilized to create a second source when a developer (licensor), owning patents, data,

know-how, patents, and technical assistance to another manufacturer (licensee) in such a manner that the licensee becomes a qualified producer of a specific item. In return for this, the licensor normally receives consideration in the form of technical assistance fees and royalty fees.

Several problems and issues associated with licensing were discussed in this thesis. The more important ones were:

a. The difficulty in determining a proper royalty fee.

b. The difficulty in selecting the best licensee.

c. The difficulty in determining legal ownership of IP.

d. The risk of technical retardation in the program.

e. The risk of not successfully qualifying the second source and the inability to hold either party responsible.

f. The difficulty of motivating the developer to participate in a licensing arrangement.

g. Licensing tends to restrict competition which is counter to acquisition policy.

3. How has licensing been accomplished in the acquisition arena?

Direct licensing has been employed by DOD as a second sourcing methodology. The contractor who originally developed the system and who owns or retains significant data or know-how pertinent to the system is contracted by the Government to accept the responsibility of a licensor. This license, tailored to the specific acquisition, usually requires the developer to select the licensee, subject to Government approval, and to transfer IP to, assist, and qualify the licensee as a second source.

4. What is the current Government policy regarding licensing?

The Government recognizes licensing as an available second sourcing method to be applied in NATO RSI programs and sparingly in other programs. Great emphasis is placed on the reasonableness of the royalty fee, the extent to which the Government has contributed to the development of the item, and to the manufacturing processes and methods involved in producing the system.

5. What are the advantages and the potential uses of licensing?

This thesis presented many benefits to a licensing strategy which are listed below:

a. The creation of a competitive atmosphere in the production phase.

b. The creation of production source options for the Government.

c. The ability of the Government to disengage from the transfer of technology between the developer and the licensee.

d. The developer receives protection and maintains control of his manufacturing data and procedures.

e. The developer receives compensation for allowing another firm to manufacture his item.

f. The ability to establish a second source without a complete technical data package.

g. The ability to establish a second source when limited IP is contained in the data package.

h. The ability to facilitate establishment of foreign production sources and NATO RSI.

i. The ability to require the developer to provide assistance to the second source.

6. Can an analytical method be developed which will aid the program manager to determine whether licensing techniques should be utilized in his project?

The researcher developed and presented the Direct Licensing Decision Model in Chapter VII. General in nature, the Model provides the decision maker a logical and organized framework to follow when contemplating a licensing strategy.

D. AREAS REQUIRING FURTHER RESEARCH

Due to limited time and resources, the researcher was unable to perform an exhaustive research effort in the area of DOD licensing. The researcher acknowledges that the following areas are fruitful for future research:

1. Determining the mechanism to link the royalty fee to the amount of contractor owned IP.

2. Determining other methods to generate leverage over the licensor so that the Government can obtain a successful license arrangement with the least amount of Government interference.

3. Applying the DLDM to several programs to confirm its validity and possibly to enhance the model by "fine tuning" it.

4. Following up on the licensing programs presented in Chapter V to evaluate future innovations and to reap the benefits from past licensing efforts.

APPENDIX A

Licensing Interview Guidelines

1. How would you define Directed Licensing?

   How does it differ from Leader/Follower?
   What are the desired objectives?

2. What influence does Licensing have on the following acquisition concepts?

   Design Competition
   Price Competition
   Rationalization, Standardization and Interoperability
   Contractor Proposal Pricing
   Mobilization Base
   Industrial Base
   Research and Development
   Technological Innovations

3. What are the key factors that the Federal Government should consider when contemplating a licensing strategy?

4. When should licensing be considered?

5. What do you perceive as the beneficial aspects of a licensing strategy?

6. What problems are encountered with licensing and how can they be resolved?

7. What recommendations would you offer to enhance future licensing acquisition strategies?

8. Comment on the workability/desirability of DOD's utilization of an "option to license" clause on major weapon system buys.

Additional Case Study Guidelines

1. What factors were considered that led to the licensing strategy?

2. What specific objectives were sought through a licensing strategy?

3. What type of licensing was used and why? (Directed, Option Clause, etc.)

4. What problems have been encountered during this acquisition?

   How were they solved?
   How could they be avoided in future acquisitions?

5. What would you say were the successful features of your licensing strategy? Why?

APPENDIX B

Defense System Communication Satellite Contract

OPTION TO LICENSE CLAUSE

7. UNPRICED OPTION FOR THE GOVERNMENT TO ACQUIRE GREATER RIGHTS IN TECHNICAL DATA, AND TO ACQUIRE PATENT RIGHTS, OR TO DIRECT LICENSING

a. The terms, conditions and definitions contained in the Rights in Technical Data and Computer Software clause, ASPR 7-104.9(a), included in this contract and which are not inconsistent with this clause, are applicable.

b. The Government shall have the option to, at a fair and reasonable price,

(1) acquire rights greater than limited rights in any data required to be delivered, or subject to order, under this contract, which is subject to limited rights.

(2) acquire a license under any patents owned, or hereafter acquired by the Contractor or any subcontractor to produce, operate, maintain, or modify any item, component, process, or computer software, produced, used, or delivered under this contract. This subparagraph does not require the payment of additional compensation for any license which the Government would be otherwise entitled to under provisions of this or any other contract,

(3) direct the Contractor to furnish technical assistance, as defined in this subparagraph, to the Government or to licensees named by the Government during the performance of this contract and for a period of 10 years thereafter. Technical assistance means such technical and other data, technical analysis and advice, training, special tooling, and any other assistance necessary for the licensee to produce, maintain, operate or modify any item or component produced, or any process or software used under this contract.

c. When the Government desires to exercise such option it shall enter into negotiations directly with the Contractor to establish the extent of the greater rights and a fair and reasonable price. The Contractor shall promptly furnish any data or technical assistance ordered without waiting for the completion of negotiations. The Contractor shall be entitled to be compensated for, prior to the completion of negotiations, the actual administrative cost for furnishing such data or technical assistance, without allowance for profit, or any profit for any rights in data.

d. If it is deemed necessary for the Government to use the data with rights greater than limited rights prior to completion of proceedings to establish whether the Contractor is entitled to assert limited rights, or of any appeal from a decision of the Contracting Officer, the Government may do so upon giving written notice to the Contractor. This notice will specify the data which is to be so used, and the nature and conditions of the use. Thereafter the parties shall promptly complete their negotiations for such greater rights. If an agreement is not reached within a reasonable time, the Contracting Officer shall enter a final decision stating the compensation, which, in his opinion, is fair and reasonable, and reasons therefore. The Contractor shall have the right to appeal this decision under the "Disputes" clause of this contract. If the Contracting Officer fails to enter the said final decision within sixty days of the said written notice, the Contractor shall have the immediate right to appeal. The Contracting Officer shall enter the said final decision within thirty days of any such appeal.

e. The following factors, among others, shall be considered in determining a fair and reasonable compensation for such greater rights in data:

(1) The benefit actually received by the Government from its use of the data.

(2) The private expense incurred by the Contractor in developing the data.

(3) The extent to which the data conferred a competitive advantage (in terms of potential for future business, whether commercial or Governmental) to the Contractor at the time of its use by the Government.

(4) The extent to which the competitive advantage in paragraph (3) above was enhanced by virtue of the contract work.

(5) The extent to which the field of technology to which the data pertains was developed by Government funds.

(6) The nature of the Government's use, and the extent to which the Contractor's interest is protected.

(7) Any obligations of the Contractor to pay others for the use of the data.

(8) The terms of any previous sales or offers of sale of the data or products to which the data pertains.

(9) The extent to which the Contractor's competence in the field was brought about by prior Government contracts.

(10) The degree of originality represented by the data (routine engineering versus high creativity).

f. Subcontract provisions:

(1) This clause, in its entirety, shall be included in all subcontracts of any tier, unless excused by the Contracting Officer in writing.

(2) The word "Contractor" appearing in this clause includes "subcontractors" unless otherwise indicated.

(3) The Contractor shall not be entitled to profit or fee for any price paid to a subcontractor for rights in data or patents.

(4) The Government may negotiate any request for greater rights directly with a subcontractor. The prime Contractor consents to the processing of an appeal by any subcontractor of any tier in the name of the prime Contractor under the Disputes clause from any decision of the Contracting Officer concerning rights in data under the clause.

(5) If a potential subcontractor refuses to accept any provisions of this clause, the Contractor shall promptly submit a written report to the Contracting Officer. The report shall state the reasons for refusal and such other pertinent information (including the extent of Contractor's efforts to obtain alternative sources, terms, or any proposed plan or agreement under which subcontractor would submit such data and accompanying rights to use) as will expedite decision of the matter by the Contracting Officer. The Contractor shall not proceed further without the written permission of the Contracting Officer.

APPENDIX C

DEPARTMENT OF THE AIR FORCE
HEADQUARTERS AIR FORCE SYSTEMS COMMAND
ANDREWS AIR FORCE BASE

16 October 1978

Subject: DCS/Contracting and Manufacturing Policy Letter: Options to Acquire Technical Data, Computer Software, and Rights

To: Division, Centers, SAMSO, 6550 ABW and Laboratories

(Contracting)

1. This letter supersedes the *Guidance Letter, Acquisition of Technical* Data, Computer Software, and Rights Thereto, 27 May 1976.

2. Based on field response to that letter and experience accumulated since that date:

a. Attachment 1 is suggested as a model Section J contract clause. It provides an option for acquiring technical data, computer software and technical assistance which may be needed in the future. The clause provides a systematic way for setting out the results of predetermined technical data and computer software rights.

b. Attachment 2 is a model Section J contract clause. It gives the Government the right to direct contractors to license to other parties new technology developed under Government contracts.

c. Attachment 3 contains sample Section C requests for certifications. They may be included in Request for Proposals (RFPs) in which option clauses similar to attachment 1 are used. Certifications concerning other contracts in which the Government has the right to acquire similar software or data are requested.

3. The AFSC Staff Judge Advocate gives the following advice concerning these clauses:

a. These clauses can only be used as a model in drafting clauses to meet the needs of a particular contract. DAR (ASPR) 1-108 states that military departments and their subordinate organizations cannot make such clauses mandatory.

b. Regulations might also require identification of, and negotiations to acquire, needed rights. DAR (ASPR) 9-202.2(d)(1)(b) states that the predetermination procedure shall not be used to require the contractor to furnish data with unlimited rights which he is entitled to

furnish with limited rights. However, DAR (ASPR) 9-202.1(c) states the Government must not be barred from bargaining and contracting to obtain such technical data as it needs. These sections are interpreted to mean that the Government can use its bargaining power to obtain what it needs but must pay a fair and reasonable price for it.

c. Inquiries and further recommendations may be directed to Mr. Frank Lukasik, or Mr. Theodore Prahinski, AFSC/JAT, AUTOVON 858-5372. Conference telephone calls of local program, contract, and legal personnel to AFSC headquarters are particularly encouraged.

4. This headquarters is particularly appreciative of the efforts of SAMSO in further refining the clauses sent with the 27 May 1976 letter. This letter remains in effect until rescinded, superseded or replaced by a formal publication. Questions or comments may be addressed to Major Jim Kasperbauer, AFSC/PMPO, AUTOVON 858-7391.

3 Atch
1. Sample Section J-Option Clause
2. Sample Section J-Directed Licensing Clause
3. Sample Section C-Certification Requests

s/JOSEPH B. ANDERSON
Dep Dir of Systems and Support Procurement
DCS/Procurement and Manufacturing

SAMPLE SECTION J - OPTION CLAUSE

7-XXXA The following clause may be used as a model in drafting predetermination and option agreements to meet the needs of specific procurements: PREDETERMINATION AND OPTION FOR TECHNICAL DATA, COMPUTER SOFTWARE, TECHNICAL ASSISTANCE, AND RIGHTS.

(a) It is agreed that the terms and conditions of this provision do not limit in any manner the Contractor's rights and obligations under the Deferred Ordering of Technical Data or Computer Software clause ASPR 7-104.9(m) if it is contained herein. The definitions set out in paragraph (n) shall be used in interpreting this clause, and the ASPR 7-104.9(a) Rights in Technical Data and Computer Software clause included in this contract, and any other provisions herein pertaining to rights in technical data and computer software. In addition, the terms, conditions and definitions of the ASPR 7-104.9(a) clause included in this contract are applicable to this predetermination and option agreement and shall govern in case of conflict with this agreement.

(b) It has been predetermined that all computer software and technical data required to be developed, generated or delivered under this contract will be delivered with unlimited rights except that excluded in paragraphs (e) and (f) below. Technical data and computer software which will be used or modified in the performance of work hereunder and to which the Government has less than unlimited rights are also listed in paragraphs (e) and (f).

(c) The Government has unlimited rights in the following technical data and computer software that will be developed, generated, used, modified or deliverable under this contract. The Government shall have the right to modify this contract for the purpose of ordering any of the items identified. The Contractor shall furnish any technical data or computer software so ordered and shall be compensated for conversion into a prescribed form, for reproduction and for delivery.

Description of Technical Data or Computer Software

(i) _____

(ii) _____

etc.

(d) The Government shall have the right to acquire by option any of the technical data or computer software listed in paragraph (d) below by modification of this contract during the performance of this contract or for a period of ____ years after the end of the period of performance as identified in PART II - SECTION H herein (and as may be modified hereafter) or after termination of this contract.

(e) The Government shall have the right to acquire the technical data and assistance lised below and fully paid up license as indicated, covering all rights, including any applicable patent rights, for the maximum prices stated, in:

(1) Any technical Data or Computer Software used in the performance of this contract, except that excluded in paragraph (f). The following maximum prices and delivery schedules apply as indicated in paragraphs (g), (h) and (m):

*Description of Technical Data and Computer Software	Maximum Rights Offered (e.g. Unlimited, Use for Government Only, etc.)	Maximum Price	Maximum Delivery After Exercise (Days)
(i)			
(ii)			
etc.			
Any other technical data			

**(2) Technical assistance necessary to produce, maintain, operate or modify any item or component produced, or any process or software used under this contract, except those excluded in paragraph (f). The following maximum prices and delivery schedules apply as indicated:

Identification of Items, Components, Processes, or Computer Software	Maximum Price	Time for Maximum Delivery After Exercise Of Option
(i)		
(ii)		
etc.		
Any other items, components, processes, or computer software		

(3) Form, fit, and function data, as defined in paragraph (n) for any items excluded from this option clause, or for which the Government does not acquire detailed technical data or assistance, or rights.

(f) Exclusions: The following are excluded from the operation of this clause:

*Identified technical data, as on a Contract Data Requirements List, can be listed here.
**Other assistance, and unidentified data, needed for backup purposes can be covered here.

(1) Manufacturing data and technical assistance pertaining to standard commercial components manufactured and sold by two or more competing suppliers.

(2) The following technical data and computer software:

(i) _____

(ii) _____

etc.

(3) Technical assistance pertaining to the following items, components, processes, and computer software:

(i) _____

(ii) _____

(g) The maximum prices stated in paragraph (e) will be reduced in accordance with paragraphs (h) and (j) if:

(1) The Government does not acquire a fully paid up license of the scope indicated.

(2) The Government acquires technical data and assistance or computer software and rights for less than the full item, component, process, or software, for which the price is established.

(3) The contractor is unable to substantiate that the pertinent items, components, processes or software were developed at private expense.

(h) Exercise of Options

(1) When the Government desires to exercise any of the above options it will notify the Contractor in writing of the technical data, or assistance desired, including the extent of, and the desired terms and conditions of any license. The contractor will furnish the technical data or assistance within the maximum delivery period specified, without waiting for completion of negotiations, or any appeal.

(2) If the technical assistance is to be furnished to a non-Government licensee, the Government will normally direct the contractor and the prospective licensee to negotiate with each other. Leader follower procedures of ASPR Section 4, Part 7, will normally be followed. Any agreements reached will be subject to Government approval and should have the provisions set out in (h)(3) below.

(3) Within _____ days the contractor will furnish a pricing proposal. Technical assistance concerning particular items, components, processes, and computer software should normally be separately priced.

Normally, any price for rights should include a flat sum, a royalty rate, and a paid-up license sum. The flat sum will be paid when the licensee produces the item, component, or computer software, or practices the process, in a fashion acceptable to the Government, or meeting stated contract specifications agreed to at the time of ordering. The flat sum will include the actual cost for furnishing such data or technical assistance plus a sum based on the factors set out in subparagraph (j). The royalty rate shall be computed on some base indicative of the future use by or for the Government. After the flat sum and royalties total the paid-up license sum, the Government shall have the right to acquire the designated items, components, processes or computer software, or have them used by or for it, without payment of further royalties or fee. Upon request the contractor will substantiate that the pertinent items, components, or processes were developed at private expense.

(4) Without waiting for the beginning, or completion of negotiations, the Government shall have the right at any time to enter a final order requiring the contractor to furnish any technical data or assistance required to be furnished under this contract to a named licensee. The order shall state what rights are being acquired by the Government, and the prices, terms, and conditions under which the data and assistance will be furnished.

(5) It is agreed that the essence of the contract, insofar as this option clause is concerned, is to give the Government the ability to transfer technology within the time period necessary to meet schedules, and before it becomes obsolescent. The time spent during the pendency of conventional appeals may effectively deprive the Government of the benefits of this option. Accordingly:

(i) The contractor will promptly furnish technical data and assistance in accordance with the terms of an order entered under paragraph (h)(4), and the Government shall have the right to use and disclose the data outside the Government in accordance with the terms of the order, during the pendency of any appeal, provided the order has been approved by the Director of Procurement and the Staff Judge Advocate of the Air Force Systems Command. The contractor shall have the period stated in the order, not less than ten days, to state his objections to any such order to the Director of Procurement.

(ii) The contractor shall have the right to appeal the amount of monetary compensation granted, but no other issue.

(iii) Appeals may be filed under the Disputes clause, or in any other forum provided for contracts of this type at the time of the entry of the order.

(iv) The Government shall pay the Contractor the compensation provided for by the order, promptly upon its entry without waiting for the completion of the Appeal.

(i) (Paragraph intentionally omitted.)

(j) The following factors shall be considered in determining the compensation due the contractor:

(1) The benefit actually received by the Government from its use of the technical assistance, greater rights, or patent rights.

(2) The private independent research and development expense, and efforts not required by any Government contract, in developing the data or the pertinent item, component, process, or computer software. This includes the expense of unsuccessful research and development which was reasonably necessary as part of the development program. Reasonableness of expenses will be determined on the basis of knowledge available at the time of the expenditure.

(3) The incentive needed to induce others to invest equivalent private expense and effort in independent research and development.

(4) Any determent to a competitive advantage (in terms of potential for future business, whether commercial or Governmental) suffered by the contractor as a result of acquisition of the technical assistance by the Government.

(5) The extent to which the competitive advantage in paragraph (4) above was enhanced by virtue of the contract work.

(6) The extent to which the field of technology to which the technical assistance pertains was developed by Government funds.

(7) Any obligations of the contractor to pay others for the use of the assistance.

(8) The terms of any previous sales or offers of sale of the assistance or products to which the assistance pertains.

(9) The extent to which the contractor's competence in the field was brought about by prior Government contracts.

(10) The degree of originality represented by the assistance (routine engineering versus high creativity).

(11) The coverage of the pertinent item, component, process or computer software by valid patents, patentable claims of pending patent applications, or copyrights.

(k) Subcontract provisions:

(1) This clause, in its entirety, shall be included in all subcontracts of any tier, unless excused by the Contracting Officer in writing, or unless the subcontracted item is a standard commercial item which is manufactured, developed or generated by more than one source of supply.

(2) The word "Contractor" appearing in this clause includes "subcontractors" unless otherwise indicated.

(3) If a subcontractor is required to furnish technical assistance directly to the Government as a result of the exercise of provisions contained herein, the Contractor shall not burden this contract with indirect charges or fees for any price paid to the subcontractor for the technical assistance.

(4) The Government may negotiate any request for greater rights directly with a subcontractor. The prime Contractor consents to the processing of an appeal by any subcontractor of any tier in the name of the prime Contractor under the Disputes clause from any decision of the Contracting Officer concerning rights in technical data or computer software under the clause.

(5) If a potential subcontractor refuses to accept any provisions of this clause, the Contractor shall promptly submit a written report to the Contracting Officer. The report shall state the reasons for refusal, whether any of the subcontract items are schedule critical, and any other pertinent information (including the extent of Contractor's efforts to obtain alternative sources, terms, or any proposed plan or agreement under which subcontractor would supply technical assistance and accompany rights to use technical data and computer software) that will expedite the decision of the Contracting Officer.

(i) With respect to subcontract items which are not schedule critical, if the Contracting Officer does not transmit written directions to the Contractor within 30 days of receiving the written report, it will be deemed that the Contracting Officer has granted permission to proceed.

(ii) With respect to any subcontract items which are schedule critical, if the Contractor has so informed the Contracting Officer in writing of their criticality, the Contractor may proceed with the procurement of the schedule critical items unless he is directed by the Contracting Officer to select an alternate subcontractor. The contract may then be equitably adjusted as to cost/price, delivery or any other provisions affected.

(l) (Paragraph intentionally omitted.)

(m) The contractor agrees that in any follow-on contract for this system:

(1) To accept technical data and computer software provisions which grant the Government the same rights in technical data and computer software and options as are granted in this contract.

(2) not to assert any right adverse to the Government which could not have been asserted under this contract.

(n) Definitions

(1) Technical assistance means such technical and other data, know-how including technical analysis, advice, and training; computer software; special tooling; and any other assistance necessary for the licensee to understand and use any data or computer software required to be delivered under this contract, or to manufacture, maintain, operate, or modify any item or component produced, or any process or software used under this contract. Manufacturing data, may be excluded for any component that can be fully identified, and can be obtained from two or more competitive sources, and the following items, components, processes, or computer software.

(Offerors may submit proposed modifications to the technical assistance definition, and requests for exemption of particular components, or any other provisions of this option clause. The Government has no desire to place contractors under obligation to furnish technical assistance concerning privately developed elements which are particularly important to its commercial position, and which it is unlikely that the Government would ever need. However, the option clause must remain broad enough to meet all potential Government needs. In particular it must be broad enough to serve a backup function if controversy arises over the obligation of the contractor to furnish data under other contract provisions.)

(2) Manufacturing data means data needed only for manufacturing purposes. It does not include form, fit, and function data, or data needed for operation, maintenance, or modification purposes.

(3) Form, fit, and function data means data necessary to integrate a process within a larger process or acquire items, components, and computer software and fit it within the system or subsystem with which it will be used. This includes sources, configuration, mating and attachment characteristics, functional characteristics, performance requirements, information necessary to modify a standard item for the particular purpose, and any additional information necessary to assure the requisite safe, dependable, and effective utilization of the item, component, process or computer software.

(4) "Licensees" include both Government and non-Government persons and organizations.

(5) Greater Rights means unlimited rights, or rights intermediate in scope between unlimited rights and either limited or restricted rights.

(6) Use for Government Only Rights means the right of the Government to furnish limited rights technical data or restricted rights computer software, to offerors or contractors who agree to use the data or software only for purposes of bidding on, or performance of, designated Government contracts.

(7) Developed, as used in the phrase "developed at private expense", means actually reduced to practice. To be considered developed, an item or component must have been constructed, a process practiced, and computer software used, and in each case must have been tested to the extent necessary to determine that it is capable of accomplishing the practical purpose for which it was developed. When an item, component, process, or software does not meet these criteria, separable portions thereof which do meet these criteria will be considered to have been developed.

(8) At private expense, as used in the phrase, "developed at private expense", means that completed development was accomplished without Government funds, and at a time when no Government contract required the performance of the development effort. Independent research and development funds compensated by the Government under approved IR&D agreements will be considered as private funds.

SAMPLE SECTION J - CONTRACT DIRECTED LICENSING CLAUSE

7-XXXB CONTRACTOR AGREEMENT TO LICENSE AND ASSIST GOVERNMENT DESIGNATED PARTIES TO USE CONTRACT PRODUCTS FOR GOVERNMENTAL PURPOSES

(a) The terms and conditions of the ASPR 7-104.9(a) (1977 Apr) clause, Rights in Technical Data and Computer Software, in effect on the effective date of this contract are applicable.

(b) Definitions:

(1) "Proprietary data" as used herein means any data generated at private expense, including limited rights technical data and restricted rights computer software.

(2) "At private expense" as used in the phrase "generated at private expense" means that generation was accomplished without the direct payment of Government funds, and includes (without limitation) independent research and development funds.

(c) Contractor agrees that, as to any proprietary data of Contractor incorporated into the manufacturing system to be developed under this contract and which must necessarily be used to successfully practice such system, Contractor will, at the request of the Government, grant a non-exclusive license under terms and conditions reasonable under the circumstances to other competent domestic contractors to the Government, such license to include, at licensee's option, the right to purchase technical assistance, on terms agreeable to the Contractor; i.e., technical advice relating to the use of any furnished technical data. Such data shall be for use by any contractor so licensed solely for procurement by the Government and for Government purposes from such licensed contractor. The licensee shall ensure that all proprietary data received from the licensor shall retain the licensor's proprietary marking.

(d) Any license to be granted under (c) above shall include, inter alia the following required provisions:

(1) Initial fee for provision of data, plus royalties for items sold where said data was used in the manufacturing thereof;

(2) Periodic reports by licensee, and auditing rights for licensor at licensee's expense;

(3) Protection of licensor's proprietary information;

(4) Agreement by licensee to hold harmless and indemnify the licensor as to any claim by or liability to licensee, to the Government or to third parties resulting from any activities under or related to the license; and

(5) Technical assistance (as defined in c above) by licensor at licensee's facilities, purchasable up to an agreed maximum number of days within an agreed period of time, at licensor's standard rates for such assistance (or, in the absence of standard rates for such assistance, at a per diem rate 2.5 times the individual's daily salary), plus all travel and living expenses. Travel time to and from licensee's facilities shall count as time worked.

(6) Grant back to licensor of a non-exclusive, royalty-free license to make and sell, for any improvements made by licensee to the licensed technology including any patents thereon, and the right to cost free disclosure of any instructions in the use of such improved technology and patents.

(e) As to any fees, royalties, and other payments due licensor under any license granted under (c) above, in the event licensee does not make such payments in accordance with the terms of its license, the Contractor shall upon notice to the Government have the right to terminate any such license unless the Government assumes such payments including reasonable interest and costs on unpaid amounts.

(f) The Government shall have the right (1) to order the contractor to grant the license defined in paragraph (c) if the contractor is unable to reach agreement with a responsible party who has negotiated in good faith or, (2) to approve or disapprove agreements negotiated by the parties, provided however, disapproval shall be limited to the reasonableness of the royalty rate.

(g) The Government agrees to hold a contractor harmless from claims by and liability to licensee, and third parties - including the Government - connected with activities under or related to any license granted under this clause, provided such liabilities are represented by final judgments or settlements (when such settlements are approved in writing by the Government) and such expenses incidental to such liabilities, except liabilities which the contractor is otherwise responsible under the express terms of the clause or clauses, if any, specified in the contract. The contractor shall give the Government or its representatives immediate notice of any suit or action filed, or prompt notice of any claim made, against the contractor arising out of the performance of this contract or rising under or related to the license. The contractor shall furnish immediately to the Government copies of all pertinent papers received by the contractor. The contractor shall, if required by the Government, authorize representatives of the Government to settle or defend any such claim and to represent the contractor in or take charge of any litigation in connection therewith; provided however, that no settlement will be made without the express written consent of the Contractor.

(h) Nothing contained in this agreement shall constitute nor shall the contractor be required to include in any license granted, any commitment which may be construed as a warranty or representation as to the scope or validity of any contractor patent or that anything made or sold by the Government or licensee will be free from infringement or patents held by third parties.

(i) Contractor will exercise best effort to have any subcontractor performing research or development work under this contract and which work will require the incorporation of this subcontractor's proprietary data to accept this clause in its subcontract and to flow the clause down to lower tier subcontracts for research and development work. If any subcontractor shall refuse to accept the clause the contractor will negotiate the best clause possible, make the subcontract conditional on Government approval within 60 days, and report the facts to the Contracting Officer within 5 working days after attainment of the best clause possible, provided, however, that subcontractors supplying somponent parts of a manufacturing system developed under this contract shall be required to furnish or license proprietary data only if there is a determination by the Contracting Officer, after notice to the subcontractor and hearings that the components or products employing the use of such data and adequate to enable practice of a manufacturing system developed under this contract are not being supplied by the particular subcontractor in sufficient quantities to satisfy Government needs.

(j) For Early Domestic Dissemination (FEDD) Data Clause

It has been determined that performance under this contract may result in the generation of data having significant early commercial potential. In recognition of the Air Force's policy of enhancing the opportunities for U.S. economic benefits by providing for early dissemination of such data to the U.S. Government and to U.S. domestic industry prior to general publication; and in recognition of the contractor's equities, as represented by the contribution of his technology and processes, it is agreed, notwithstanding any other provisions of this contract, that the data developed hereunder, shall be considered as falling within the following categories and shall be treated in accordance with the conditions specified therein:

(1) Category 1 Data

This data shall comprise all data developed and specified to be delivered to the Government under this contract with the exception of Category 2 data described below. For descriptive purposes only, Category 1 data will include progress, summary, and final technical reports, test results, and other general information and data necessary for the technical management and business administration of the contract. The rights of the parties to Category 1 data are specified in the Rights in Data and Computer Software clause of this contract.

(2) Category 2 Data

This data shall include detailed technical data, engineering drawings and manufacturing information. Specific requirements thereof shall include, but not be limited thereto: design layouts, drawings, analyses, details of unique processes essential to design and manufacture, details of performance ratings; dimensional and tolerance data; critical manufacturing assembly sequences; input and output parameters; physical characteristics, including forms and finishes; details of material identification; inspection test and evaluation requirements and criteria; necessary calibration information; and quality control data. It will not include contractor's standard commercial and proprietary data, as defined in the Rights in Data and Computer Software Clause of this contract. It is agreed that when any or all of the Category 2 Data is required to be furnished to the Government under this contract, or when such data is requested from the contractor by other U.S. domestic manufacturers, it will be furnished the requestor without charge. (Collection and reproduction costs may be charged to the non-governmental requestor), and such Category 2 Data shall be marked with the Restrictive Use Legend set forth below and the data shall hereafter be handled in accordance with the conditions of the legend and these provisions.

(3) FOR EARLY DOMESTIC DISSEMINATION LEGEND

Because of its possible significant early commercial value, this data developed under a U.S. Government contract is being disseminated within the U.S. in advance of general publication. This data may be duplicated and used by the recipient with the expressed limitations that the data will not be published nor will it be released to foreign parties without permission of (name of contractor) and appropriate export licenses (22 USC 1934; 22 CFR, Pt. 121; 22 USC 1611-1613; 50 USC App 2401-2413; and 15 CFR Pts 370-399). Release of this data to other domestic parties by the recipient shall only be made subject to the limitations contained in Air Force Contract _____. These limitations shall be considered void after _____. This legend shall be marked in any reproduction of this data in whole or in part.

(4) It is further agreed that the contractor will not publish or grant permission to publish Category 2 Data, release or grant permission to release said data to foreign parties, or transfer this information to foreign parties in any form without prior concurrence of the Contracting Officer. However, any designation of data as Category 2 Data shall not be construed to prohibit the Contractor or the Government from engaging in general discussions - presentations involving such data with other domestic parties. Further, the Contractor agrees not to release Category 2 Data to other domestic parties without first obtaining an agreement by the parties to abide by the limitations of the legend. It is also agreed notwithstanding the limitations of the Legend applied to Category 2 Data delivered to the Government under the terms of this contract, that the Government may release such data to foreign governments

for fulfillment of Government purposes. It is to be understood that these provisions and limitations of the Legend will become void as to Category 2 Data at a time period two years after the aforesaid Category 2 Data is contained in a general publication. The rights of the parties to such data shall thereafter be governed by the Rights in Data and Computer Software Clause of this contract.

(k) If the Contractor's background technical data is required to be delivered under this contract in conjunction with a requirement for new and/or revised data, such portions of the deliverable data need not be revised to add the number of this contract and the requirements of ASPR 7-104.9(a) and ASPR 7-104.9(p) shall not apply thereto.

SAMPLE SECTION C - CERTIFICATION REQUESTS

1. The ASPR 7-2003.66 Requirement for Technical Data Certification is useful in any contract to acquire technical data.

2. The following may be useful in any contract to acquire computer software:

Requirement for Computer Software Certification

> The offeror shall submit with his offer a certification as to whether he has developed, generated, delivered, or is obligated to deliver to the Government under any contract or subcontract the same or substantially the same, computer software included in his offer. If so, he shall identify any contract or subcontract under which such computer software was delivered, and the place of delivery.

3. The following provision may be useful in contracts containing options to acquire technical assistance, technical data, computer software, or rights therein:

Requirement for Technical Data and Computer Software Option Rights Certification

> The offeror shall submit with his offer a certification as to whether the Government has an option rights to acquire technical assistance, technical data, or computer software, or rights therein, which is substantially the same as that which he proposes to develop, generate, modify, use, or deliver in the performance of this contract. If such option rights do exist, identify any contract or subcontract containing the option provisions, and the cognizant Procuring Contracting Officer.

APPENDIX D

DIRECTOR OF DEFENSE RESEARCH AND ENGINEERING
WASHINGTON, D. C. 20301

7 JAN 1976

MEMORANDUM FOR THE ASSISTANT SECRETARY OF THE AIR FORCE (RESEARCH AND DEVELOPMENT)

SUBJECT: IR&D Patent and Data Rights: Use of Special Data Clause

Your memo of 3 November 1975 explained the use by the Air Force of several types of data clauses. One clause in particular appears to offer a solution to the acquisition of data necessary for competitive reprocurements. This clause is the one identified as the unpriced option to direct the furnishing of data needed for manufacture of the DSCS III Communication Satellite. I am very interested in the Air Force experience with the use of this clause and would appreciate a response to the following questions:

1. Has the clause been used in RFP's and on contracts other than the DSCS III Com Sat? If not, are there plans to test the use of the clause in other situations?

2. Has sufficient time elasped to have gained experience in the use of the clause, particularly the ability to identify the needed data and to negotiate a price acceptable both to the contractor and to DoD? If not, what is the appropriate point in time for such experience?

3. Was the data needed for manufacture identified in a generic manner in the RFP and in the contract's Data Requirements List?

Malcolm R. Currie

cc: ASA(R&D) & (I&L)
ASN(R&D) & (I&L)

APPENDIX E

Public Law 94-361

Sec 805. (a) During the period beginning on October 1, 1976, and ending on September 30, 1978, each contract entered into by a military department for development or procurement of a major system shall, except as provided in subsection (b), include a deferred ordering clause giving the procuring authority for such system the option to purchase from the contractor involved technical data and computer software packages relating to such system. Such clause shall require such packages to be in sufficient detail to enable such procuring authority to reprocure such system, or a subsystem of such system, from a contractor other than the contractor involved in such contract.

(b) Any procuring authority to whom subsection (a) applies may exempt a particular contract for development or procurement of a major system from the requirements of such subsection, but, prior to the time any such contract without the deferred ordering clause required by such subsection is entered into, the procuring authority concerned shall report his intent to enter into such contract to the Committees on Armed Services and Appropriations of the Senate and House of Representatives with a detailed explanation for such exemption.

(c) For the purposes of this section:

(1) The term "major system" means a composite of equipment, skills, and techniques which is capable of performing, or supporting performance of, an operational role and which requires an investment in research, design, test, and evaluation of not less than $50 million or a total production investment of not less than $200 million.

(2) The term "deferred ordering" means delaying the ordering of an item related to a contract until a need for such item is established and the requirements for such item can be specifically identified for delivery under such contract.

(3) The term "technical data" means, with respect to a major system, recorded data, regardless of form or characteristic, of a scientific or technical nature which is related to such system.

APPENDIX F

DAR Clause on Deferred Ordering Of Technical Data Or Computer Software For Major System Contracts

DEFERRED ORDERING OF TECHNICAL DATA OR COMPUTER SOFTWARE - MAJOR SYSTEM CONTRACTS (1976)

In addition to technical data or computer software specified elsewhere in this contract for delivery hereunder, at any time during the performance of this contract or within a period of three (3) years after acceptance of all items to be delivered under this contract (other than technical data or computer software), or prior to the termination of this contract, the Government may order, and the contractor agrees to deliver, any technical data or computer software (both as defined in the Rights in Technical Data and Computer Software clause of this contract) used in the manufacture, assembly and test of the system or any subsystem of such system developed or procured under this contract, in sufficient detail to enable the reprocurement of such system or subsystem from a source other than the Contractor. The Government shall have the rights to use the technical data or computer software so ordered for procurement for Government purposes of the system or subsystem from a source other than the Contractor, notwithstanding any patents now or hereafter owned or controlled by the Contractor. If and when such technical data or computer software is ordered, the Contractor will be compensated for such data or software and the rights thereto; but as to technical data or computer software generated in the performance of this contract, the compensation shall not exceed the cost of conversion to the prescribed form for reproduction and delivery. The Contractor shall include this clause in all subcontracts awarded under this contract, and when so included the words "contract" and "contractor" shall be deemed to refer to the subcontract and subcontractor respectively.

APPENDIX G

Title 10, United States Code 2386

Copyrights patents, designs, etc.; acquisition

Funds appropriated for a military department available for making or procuring supplies may be used to acquire any of the following if the acquisition relates to supplies or processes produced or used by or for, or useful to, that department:

(1) Copyrights, patents, and applications for patents.

(2) Licenses under copyrights, patents, and applications for patents.

(3) Designs, processes, and manufacturing data.

(4) Releases, before suit is brought, for past infringement of patents or copyrights.

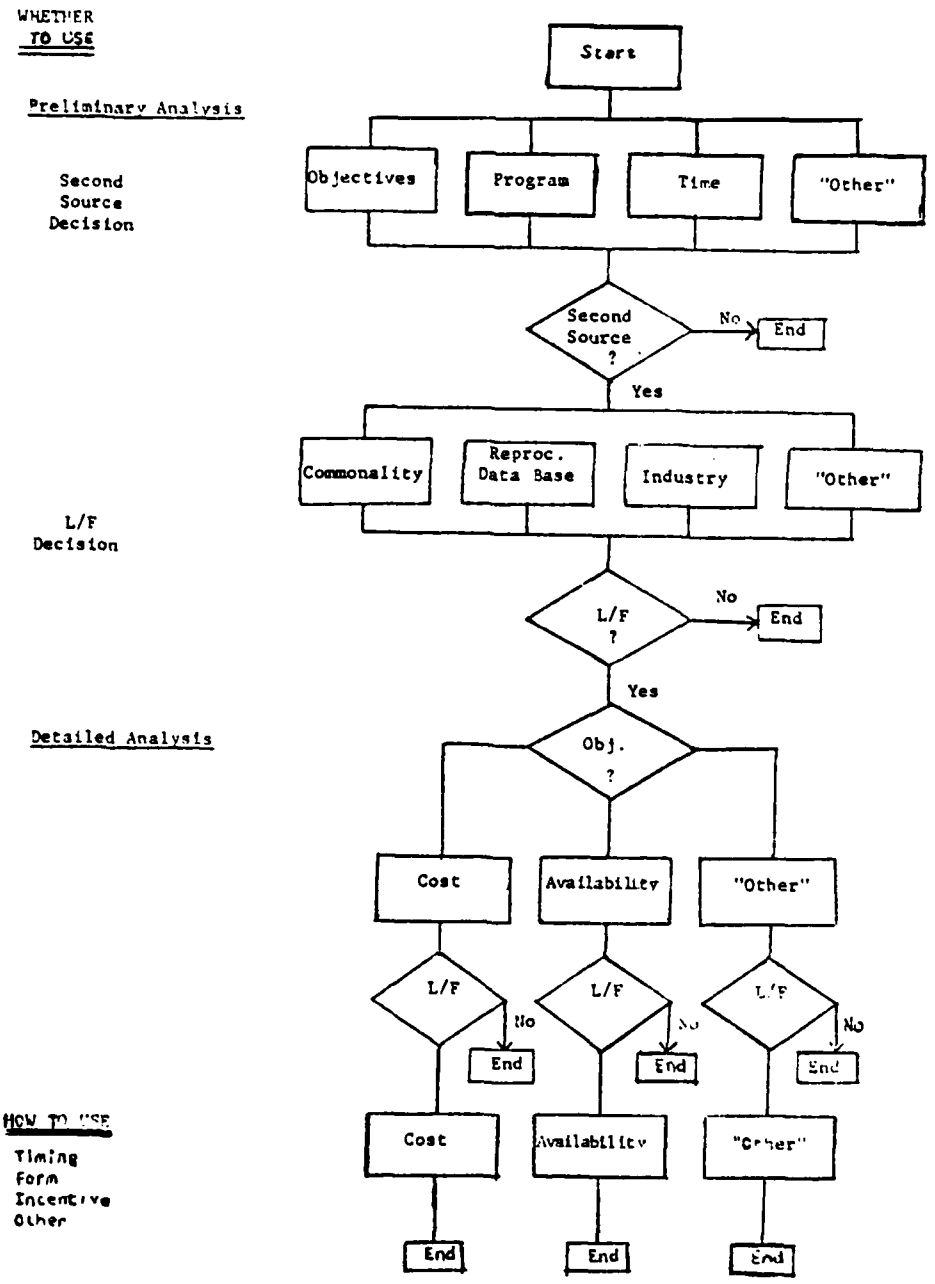
APPENDIX H

SECOND SOURCING METHOD SELECTION MODEL (PRE-PRODUCTION)

Variables		Methodology				
		F[3]	TDP	DL	L-F	CT
Quantity	High	+	+	+	+	+
	Medium	+	+	0	0	+
	Low	0	0	-	-	0
Duration	Long	+	+	+	+	+
	Medium	+	+	0	+	+
	Short	0	0	X	X	0
Learning Curve	Steep	-	-	-	0	0
	Flat	+	+	+	+	+
Technical Complexity	High	0	X	+	+	*
	Medium	+	-	+	+	+
	Low	+	+	+	+	+
State of the Art	Yes	0	X	+	+	*
	No	+	+	+	+	+
Other Application	Yes	+	0	+	0	+
	No	+	+	+	+	+
Degree of Private R&D	High	0	X	0	X	-
	Low	+	0	+	+	+
Tooling Costs	High	-	-	-	-	X
	Low	+	+	+	+	+
Govt. Tool Transfer Cost	High	0	0	0	0	0
	Low	+	+	+	+	+
Contractor Capacity	Excess	-	-	-	-	-
	Deficient	+	+	+	+	+
Maintenance Requirement	Significant	X	0	0	0	0
	Minimal	+	+	+	+	+
Production Lead Time	Long	-	-	-	-	-
	Short	+	+	+	+	+
Degree of Subcontracting	Heavy	0	-	-	-	-
	Light	+	+	+	+	+
Contractual Complexity	Complex	-	-	-	-	-
	Simple	+	+	+	+	+

APPENDIX I

Thompson-Rubenstein Leader/Follower Model



APPENDIX J

VHSIC Licensing Clause

CONTRACTOR AGREEMENT TO LICENSE AND ASSIST GOVERNMENT DESIGNATED PARTIES TO USE CONTRACT PRODUCTS FOR GOVERNMENT PURPOSES

(a) The terms and conditions of the DAR 7-104.9(a) clause, "RIGHTS IN TECHNICAL DATA AND COMPUTER SOFTWARE", in effect on the effective date of this contract are applicable as well as the requirements set forth below.

(b) Contractor agrees that, as to any data or computer software of Contractor incorporated into the manufacturing system to be developed under this contract and which must necessarily be used to successfully practice such system, Contractor will, at the direction of the PCO, grant a license for all or part of the manufacturing system under terms and conditions reasonable under the circumstances to other competent domestic organizations selected by the PCO, such license to include, at licensee's option, the right to purchase technical assistance i.e., technical advice relating to the use of any furnished technical data or computer software. Such technical data or computer software shall be for use by an organization so licensed solely for procurement by the Government or for other Government purposes, including but not limited to FMS. If the Contractor's manufacturing system employs any equipment which is not readily available for sale to , or lease by other domestic organizations the contractor agrees that for a reasonable price, it will sell or lease that equipment to other domestic organizations, or license other domestic organizations to manufacture that equipment.

(c) As to any fees, royalties, and other payments due licensor under any license granted under (b) above, in the event licensee does not make such payments in accordance with the terms of its license, the Contractor shall upon notice to the PCO, have the right to terminate any such license unless the Government assumes such payments.

(d) The PCO shall have the right to order the Contractor to grant the license defined in paragraph (b) if the contractor is unable to reach agreement with the responsible party who has negotiated in good faith.

(e) Such license shall not become effective without the approval of the PCO, provided however, that such approval shall be based solely on the reasonableness of the royalty bases and rates.

(f) Nothing contained in this agreement shall constitute, nor shall the Contractor be required to include in any license granted, any commitment which may be construed as a warranty or representation as to the scope or validity of any contractor patent or that anything made or sold by the Government or licensee will be free from infringement of patents held by third parties.

(g) The provisions of this clause will be incorporated in all subcontracts including purchase orders associated with this contract, unless the subcontract of purchase order is for a supply or service which the subcontractor or vendor sells or leases to the public or industry in the general course of its business.

(h) The term successfully practice as used in paragraph (b) above is hereby defined as the ability to produce VHSIC chips by employing the manufacturing system of the licensor.

SELECTED REFERENCES

I. BOOKS

1. Bain, J.S., Barriers To New Competition, Harvard University Press, Cambridge, Md: 1956.

2. Clark, J.M., Competition As A Dynamic Process, The Bookings Institution, Washington, D.C.: 1961.

3. Kottke, Frank, The Promotion of Price Competition Where Sellers Are Few, Lexington Books, Lexington, Mass: 1978.

4. Papandreou, A.G. and Wheeler, J.T., Competition and Its Regulations, Prentice-Hall, Inc., New York, N.Y.: 1954.

II. ARTICLES

5. Agapos, A.M., "Competition in the Defense Industry-An Economic Paradox", Journal of Economic Issues, June 1971, V.5(2), pp.41-55.

6. Church, D.W., "Defense Procurement Policy Goal: Maximum Competition", Commander's Digest, December 1977, V.20(21), pp.1-8.

7. Eustace, H.E., "Arm Wrestling With Industry: Pentagon Antes $200 Million For Fast ICs", Defense Electronics, January 1979, pp.39-44+.

8. Fuscher, S.R., "A Study of How the Government Obtains Patent Rights Under the DAR and FAR Patent Rights Clauses", Public Contract Law Journal, December 1978, pp. 296-340.

9. ..."GAO Clouds AV-8B Fund Restoration", Aviation Week and Space Technology, 12 February 1979, V.110(7), p.24.

10. Gordon, H.J., "Defense Equipment: Second Sourcing Production", Program Manager, July-August 1979, V.8(4), pp.4-5.

11. Griffiths, Kenneth and Kanzaki, G.A., "The Technical Data Package and Competitive Procurement", Defense Management Journal, April 1972, V.8(1), pp. 17-21.

12. Haughey, C.S., "Technology Transfer in a Competitive Environment", Defense Systems Management Review, Winter 1979, pp.27-34.

13. Hougen, H.M., "Limitations on the Right to Transfer Technology", Defense Systems Management Review, Winter 1979, pp. 35-43.

14. ..."Industrial Research Institute Position Statement on Licensing of Technology", Resource Management, May 1979, V.22(3), pp.32-33.

15. Keller, R. W., "Identifying and Protecting Proprietary Information in Government Contracting", Contract Management, March 1980, V.20(3), pp.6-8+.

16. Killing, J.P., "Manufacturing Under License", Business Quarterly, Winter 1977, V.42, pp.22-29.

17. Leffler, R., "The Military Looks and Listens to Industry", Logictics Spectrum, Fall 1976, pp.23-28.

18. March, W., "Acquiring and Selling Technology - Licensing Do's and Don'ts", Resource Management, May 1979, V.22(3), pp.18-21.

19. Quesenberry, W.O., "Patents and Technology Transfer", Defense Systems Management Review, Winter 1979, pp.16-21.

20. Saragovitz, H.V. and Dobkin, J.A., "Patents, Technical Data and International Defense Agreements", Villanova Law Review, Spring 1968, V.13, pp.457-486.

21. Senkus, M., "Acquiring and Selling Technology - Licensing Sources and Resources", Resource Management, May 1979, V.22(3), pp.22-25.

22. Soffer, B., "Patent Activity and International Competitiveness", Resource Management, November 1978, V.21, pp.34-37.

III. OFFICIAL DOCUMENTS

23. Department of the Air Force, Contract F04701-76-C-0092, between Headquarters, Space & Missile Systems Organizations and General Electric Company, 1 February 1976.

24. General Accounting Office, "Coproduction Programs and Licensing Arrangements in Foreign Countries", B-163582, December 1975.

25. General Accounting Office, "Evaluation of Two Proposed Methods For Enhancing Competition in Weapon Systems Procurement", B-39995, July 1969.

26. General Accounting Office, "Matter of Singer Company, Inc., Kearfott Division", B-193270, 6 June 1979.

27. General Accounting Office, "Review of Patent Royalty Files", B-133386, August 1977.

28. General Accounting Office, "Ways for the Department of Defense to Reduce Its Administrative Cost of Awarding Negotiated Contracts", B-168450, September 1973.

29. Naval Ordnance Systems Command, Contract N00017-72-C-4214, with Oto Melara, La Spezia, Italy, 30 June 1972.

30. Naval Sea Systems Command, Request For Proposal For System Design/Specification For LCAC, solicitation Number N00024-80-R-2065(Q), 21 February 1980.

31. Office of Federal Procurement, Pamphlet No. 1, "Major System Acquisition - a Discussion of the Acquisition of OMB Circular A-109", August 1976.

32. Office of Management and Budget, Circular A-109, "Major System Acquisitions", 19 March 1980.

33. United States Code, Title 10, Section 2386.

34. U.S. Commission On Government Procurement, Recommendations of the Commission on Government Procurement: A Final Assessment, U.S. Government Printing Office, Washington, D.C., 31 May 1979.

35. U.S. Commission On Government Procurement, Report of the Commission on Government Procurement, U.S. Government Printing Office, Washington, D.C., December 1972.

36. U.S. Congress, Public Law 94-361, DOD Appropriations Authority Act of 1977, 90 Stat. 923, Appendix 805, 14 July 1976.

37. U.S. Department of Defense, Defense Acquisition Regulations, Government Printing Office, Washington, D.C., July 1975.

38. U.S. Department of Defense, Directive 5000.1, "Major System Acquisitions", 19 March 1980.

39. U.S. Department of Defense, Directive 5000.2, "Major System Acquisition Process", 19 March 1980.

40. U.S. Government, Contract N00019-78-C-0206, with Williams Research Corporation, "Use of WRC Technical Data and Computer Software by the Government Pertaining to the F-107 Series Engine", 29 August 1978.

IV. MISCELLANEOUS

41. Ad Hoc Committee on Technology Transfer, "The Effectiveness of the Army Technical Data Package in Technology Transfer for Procurement", National Materials Advisory Board, National Academy of Sciences, Washington, D.C., August 1975.

42. Air Force Institute of Technology, "Government Contract Law", Wright-Patterson Air Force Base, Ohio, July 1975.

43. Anderson, J.B., Deputy Director of Systems and Support Procurement, Air Force Systems Command, "DCS/Contracting and Manufacturing Policy Letter: Options to Acquire Technical Data, Computer Software, and Rights", Memorandum, 16 October 1978.

44. Austin, W.I., Director, Acquisition and Business Division, Joint Cruise Missile Project Office, "House Appropriations Committee Studies and Investigations Staff (Hac S&Is) Study of Extent of Price Competition in DOD Contracting", Letter to Chief of Naval Material, 26 February 1980.

45. Benson, J.L., Program Manager LCAC, Naval Sea Systems Command, "Turning Technology into Fleet Capability: Transition of the Amphibious Assault Landing Craft Research and Development Into Production of a Landing Craft, Air Cushion", Public Briefing Paper, 18 April 1980.

46. Carter, G.A., Directed Licensing: An Evaluation of a Proposed Technique for Reducing the Procurement Cost of Aircraft, Study R-1604-PR, Rand Corporation, Santa Monica, California, December 1974.

47. Competition in Production, Working Group, "Competition in the Production Stage", Memorandum to Director, DAR Council, DAR Case 79-42, undated draft.

48. Conrad, D.M., Special Assistant to the Director, Federal Acquisition Institute, "Technology Transfer Export-Import", Speech to Purchasing Management Association of Washington, D.C., 15 April 1980.

49. Conrad, D.M.; Collins, D.E.; Masterson, M.; and Morse, M., Implementation of NATO Guidelines on Intellectual Property Rights, Study, Logistics Management Institute, Washington, D.C., January 1979.

50. Freeman, R.G., Deputy Chief of Naval Material, "Advanced Procurement Plan No. 223-72 for 76mm/62 Caliber Compact Gun Mount, Mod 1", Memorandum to Commander, Naval Ordnance Systems Command, 3 April 1972.

51. Garvert, W.C., Patent Counsel, Joint Cruise Missile Project Office, "Acquisition of Data and Data Rights", Conference of Navy Patent Counsel, Annapolis, Maryland, 29 April-1 May, 1980.

52. Hall, G.R. and Johnson, R.H., Aircraft Co-production and Procurement Strategy, Study R-450-PR, Rand Corporation, Santa Monica, California, May 1967.

53. Hall, G.R., ar ' Johnson, R.H., Competition in the Procurement of Military Hard Goods, Study P-3796-1, Rand Corporation, Santa Monica, California, June 1968.

54. Henderson, W., "Direct Licensing", OSD White Paper, Office of the Assistant Secretary of Defense, Washington, D.C., 26 November 1968.

55. Humphrey, W.B., "A History and Analysis of Section 1498 of Title 28 of the United States Code Dealing With Unlicensed Use of Patents by the U.S. Government and Its Effect on Procurement", Thesis, Naval Postgraduate School, Monterey, California, March 1974.

56. Johnson, R.E., Technology Licensing In Defense Procurement: A Proposal, Study P-3982, Rand Corporation, Santa Monica, California, November 1968.

57. Johnson, R.E. and Mc Kie, J.W., Competition in the Reprocurement Process, Report Rm-5657-PR, Rand Corporation, Santa Monica, California, May 1968.

58. Lamm, D.V., "Dual Sourcing in the Major Weapon System Acquisition", Proceedings Seventh Annual Acquisition Research Symposium, Hershey, Pennsylvania, 31 May-2 June 1978, pp.347-351.

59. ..."LCAC Competition Underway", The Observer, Naval Sea Systems Command, 19 June 1980, V. IV(26), p.1.

60. Lenk, B.R., "Government Procurement Policy: A Survey of Strategies and Techniques", The George Washington University School of Engineering and Applied Science Institute for Management Science and Engineering, 12 May 1979.

61. Currie, M.R., "IR&D Patent and Data Rights: Use of Special Data Clause", Memorandum, Director of Defense Research and Engineering, Washington, D.C., 7 January 1976.

62. McBrayer, D., "Request for Author to Negotiate", Clearance No. JCMP 10006, Joint Cruise Missile Project Office, Washington, D.C., 15 January 1980.

63. McKie, J.M., "Proprietary Rights and Competition in Government Procurement", Memorandum RM 5038 PR, Rand Corporation, Santa Monica, California, June 1966.

64. Nash, R.C. and Lasken, J.E., "Procurement of Technical Data", Patents and Technical Data, Government Contracts Monograph No. 10, George Washington University, Washington, D.C., 1967, Chapter III.

65. Parry, D.S., "Second Sourcing in the Acquisition of Major Weapon Systems", Thesis, Naval Postgraduate School, Monterey, California, June 1979.

66. Phelps, F.A., General Counsel, Naval Air Systems Command, "JCMP Submission to the General Accounting Office in Response to the protest by Singer Company, Inc., Kearfott Division", Letter to the Comptroller General of the United States, 3 April 1979.

67. Postman, M.S., Patent Attorney, Office of the Judge Advocate General, Department of the Air Force, "Proposed DAR Case Relating to Rights in Technical Data and Computer System", Letter to the Defense Acquisition Regulatory Council, 28 May 1980.

68. Prahinski, T., Patent Lawyer, Air Force Systems Command, "Educational Material and Contract Clauses Dealing with Acquisition of Technical Data and Rights", Memorandum, 8 October 1975.

69. Rich, M.D., Competition in the Acquisition of Major Weapon Systems: Legislative Perspectives, Report R 2058 PR, Rand Corporation, Santa Monica, California, November 1976.

70. Rorie, C.J., Deputy Commander for Combat Systems, Naval Sea Systems Command, "Mobilization Requirements for FMC/Northern Ordnance Division (FMC/NOD); Justification for", Memorandum to Chief of Naval Material, 30 May 1979.

71. Sellers, B.R., "Competition in the Acquisition of Major Weapon Systems", Thesis, Naval Postgraduate School, Monterey, California, September 1979.

72. Thompson, C.W.N. and Rubenstein, A.H., "The Leader/Follower Concept in Acquisition", Study, International Applied Science and Technical Associates, Inc., Evanston, Illinois, 15 November 1979.

V. PERSONAL INTERVIEWS

73. Ahearn, Allen E., Office of the Deputy Under Secretary of Defense for Research and Engineering, interview granted 17 June 1980.

74. Alducin, Donald G., Major, USAF, Chief, Manufacturing/Production Branch, Joint Cruise Missile Project Office, interview granted 16 June 1980.

75. Austin, Walter L., Capt, SC, USN, Director, Acquisition and Business Division, Joint Cruise Missile Project Office, interview granted 18 June 1980.

76. Avery, Bruce F., CDR, SC, USN, (RET), Former Acquisition Director, Joint Cruise Missile Project Office, interview conducted 24 June 1980.

77. Benson, Jeffery L., Program Manager LCAC, Naval Sea Systems Command, interview granted 20 June 1980.

78. Caldwell, Anne, Contractor Negotiator MK 75, Naval Sea Systems Command, interview granted 19 June 1980.

79. Caposell, Charles D., NAVAIR Program Manager VHSIC, Naval Air Systems Command, interview granted 17 June 1980.

80. Childs, William, Procurement Analyst, Federal Acquisition Regulation Office, interview granted 20 June, 1980.

81. Ciavardoni, Mark, Contract Negotiator LCAC, Naval Sea Systems Command, interview granted 19 June 1980.

82. Conrad, David M., Special Assistant to the Director, Federal Acquisition Institute, interview granted 20 June 1980.

83. Cormany, David W., Capt, USAF, Chief, Production Engineering, Joint Cruise Missile Project Office, interview granted 16 June 1980.

84. Crawford, Robert T., Patent Liaison, Naval Material Command, interview granted 18 June 1980.

85. De Luca, Anthony J., Deputy Directory, Systems and Support Contracts, Air Force Systems Command, interview granted 23 June 1980.

86. Dun Lavey, Justin P., Patent Counsel, Naval Air Systems Command, interview granted 18 June 1980.

87. Fredman, Theodore, General Counsel, Joint Cruise Missile Project Office, informal telephone interview conducted 28 April 1980.

88. Garvert, William C., Patent Counsel, Joint Cruise Missile Project Office, informal telephone interview conducted 10 March 1980.

89. Garvin, John C., Jr., Chief, Patent Law Division, U.S. Army Missile Command, informal telephone interview conducted 15 May 1980.

90. Gibson, Robert P., Patent Law Division, Material Development and Readiness Command, Department of the Army, informal telephone interview conducted 1 May 1980.

91. Gordon, Harvey J., Deputy for Procurement (SAF/AL), Office of the Secretary of the Air Force, interview granted 20 June 1980.

92. Hahn, Thomas, Former House Armed Services Committee Staff Member, informal telephone interview conducted 18 April 1980.

93. Haynes, Richard S., Associate Counsel for Major Programs, Naval Electronic Systems Command, interview granted 19 June 1980.

94. Henderson, Walter D., Office of the Deputy Under Secretary of Defense for Research and Engineering, interview granted 17 June 1980.

95. Hersh, Donald L., Associate Counsel, Naval Air Systems Command, interview granted 24 June 1980.

96. Hougen, Howard M., Lt.Col., JAGC, USA, Office of the Judge Advocate General, Department of the Army, interview granted 17 June 1980.

97. Kemp, I.L., Office of Secretary of the Air Force, interview granted 20 June 1980.

98. Kwitnieski, Al F., Patent Counsel for the Navy, Office of Naval Research, informal telephone interview conducted 8 May 1980.

99. Lambert, William, Director of Contracts, Boeing Aerospace, interview granted 15 May 1980.

100. Lannen, John H., Jr., Executive Director for Procurement Management, Naval Air Systems Command, interview granted 18 June 1980.

101. Lewis, Stanley P., Col., USMC, Program Manager AV-8B, Naval Air Systems Command, interview granted 17 June 1980.

102. Locke, Walter M., RADM, USN, Director, Joint Cruise Missile Project Office, interview granted 24 June 1980.

103. Lukasik, Frank A., Patent Counsel, Air Force Systems Command, interview granted 18 June 1980.

104. Nelson, Erling W., Deputy Counsel, Naval Air Systems Command, interview granted 24 June 1980.

105. O'Sullivan, Denis T., Assistant Counsel, Naval Sea Systems Command, interview granted 23 June 1980.

106. Postman, Martin S., Patent Attorney, Office of the Judge Advocate General, Department of the Air Force, informal telephone interviews conducted 6 May, 27 June 1980.

107. Parhinski, Theodore, Patent Lawyer, Air Force Systems Command, interview granted 23 June 1980.

108. Rak, Dan S., Assistant General Counsel (Procurement), Office of Secretary of the Air Force, interview granted 20 June 1980.

109. Raubitschek, John H., Patent Counsel, Naval Sea Systems Command, interview granted 23 June 1980.

110. Rice, James W., Major, USAF, Contracting Officer F-107 engines, Joint Cruise Missiles Project Office, interview granted 16 June 1980.

111. Rumberger, Robert, Contracting Officer AV-8B, Naval Air Systems Command, interview granted 23 June 1980.

112. Shirley, Leroy J., Project Engineer MK 75, Naval Sea Systems Command, interview granted 20 June 1980.

113. Sumney, Larry W., Project Manager VHSIC, Office of Under Secretary of Defense (R&E) Research and Advanced Technology, informal telephone interview conducted 1 May 1980.

114. Thompson, Charles W.N., International Applied Science and Technology Associates, Inc., informal telephone interview conducted 24 April 1980.

115. Trimble, Robert F., Major General, USAF, (RET), Director, Contracts and Systems Acquisition, Office of the Deputy Under Secretary of Defense for Research and Engineering, interview granted 17 June 1980.

116. Trusela, Edward J., Principle Assistant/Senior Strategist, Air Force Systems Command, interview granted 23 June 1980.

117. Turnquist, John, General Counsel, Naval Electronic Systems Command, informal telephone interview conducted 15 May 1980.

118. Weber, David H., Contracting Officer VHSIC, Naval Electronic Systems Command, interview granted 19 June 1980.

119. Wohlfarth, Robert M., Deputy Patent Counsel, Joint Cruise Missiles Project Office, interview granted 24 June 1980.

120. Zilin, Berry, Capt., USAF, Chief, Advanced Plans and Requirements, Program Control Office, Space and Missiles Division, Air Force Systems Command, informal telephone interview conducted 6 May 1980.

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